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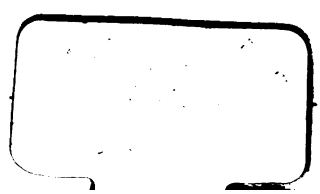

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JOSIAH N. HALL, M. D.
PRESIDENT 1900-1901

Transactions

of the

Colorado State Medical Society

Thirtieth Annual Convention

By-Laws and List of Members

Denver, August, 1900
Published for the Society

Press of
The Smith-Brooks Printing Company
Denver, Colorado

OFFICERS.

1900-1901.

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SECOND VICE PRESIDENT,

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MINNIE C. T. LOVE, M. D., Denver.

ASSISTANT RECORDING SECRETARY,

W. A. KICKLAND, M. D., Fort Collins.

TREASURER,

WM. J. ROTHWELL, M. D., Denver.

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W. E. WILSON, M. D.....Denver
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S. E. SOLLY, M. D.....Colorado Springs
J. T. ESKRIDGE, M. D.....Denver
E. J. A. ROGERS, M. D.....Denver
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COMMITTEE ON ADMISSIONS.

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S. G. KAHN, M. D.....Leadville
C. A. POWERS, M. D.....Denver
D. F. DAYTON, M. D.....Trinidad

STANDING COMMITTEES.

(Appointed by the President.)

1900-1901.

EXECUTIVE—E. P. Hershey, chairman; T. J. Gallaher, S. D. Hopkins, H. G. Wetherill, C. P. Conroy, Charles A. Graham, Geo. E. Tyler, H. G. Harvey, J. N. Hall.

PUBLICATION—H. B. Whitney, chairman; Minnie C. T. Love, H. T. Pershing, Alfred Mann, Melville Black, W. C. Bane, J. M. Perkins.

FINANCE—P. J. McHugh, chairman; C. D. Nelson, W. W. Reed, Alice Moore, W. N. Beggs, A. Taussig, S. D. Van Meter.

ETHICS—J. M. Blaine, chairman; D. H. Coover, Una G. Roberts, A. K. Worthington, E. C. Rivers, L. Z. Coman, A. H. Williams.

SANITATION—H. W. McLauthlin, chairman; W. W. Grant, C. E. Edson, C. F. Gardiner, Paul E. Spratlin, Hugh L. Taylor, J. C. Chipman, Chas. Jaeger, Philip Hillkowitz.

NECROLOGY—C. A. Powers, chairman; J. Tracey Melvin, P. F. Gildea, Maurice Kahn, C. F. Shollenberger, W. S. Chapman, O. R. Shippey.

LEGISLATION—C. B. Lyman, chairman; Carey K. Fleming, B. L. Jefferson, Leonard Freeman, Robert Levy, H. W. McLauthlin, W. W. Grant, John Grass, J. N. Hall.

LITERATURE—Edward Jackson, chairman; C. D. Spivak, E. W. Stevens, Russell B. Freeman, Josephine Peavey.

TUBERCULOSIS IN COLORADO—Henry Sewall, chairman; W. C. Mitchell, W. H. Bergtold, Sherman G. Bonney, Charles Denison, S. E. Solly, F. E. Waxham, C. B. Van Zant, W. A. Kickland, Frank Finney, R. W. Corwin, W. T. Little, H. R. Bull. Ex-officio: G. E. Tyler, Secretary State Board of Health; T. J. Carlin, Health Commissioner of Denver; R. K. Hutchings, Health Commissioner of Colorado Springs.

HISTORY OF MEDICINE IN COLORADO—C. D. Spivak, chairman; Edward Jackson, E. W. Stevens, Russell B. Freeman, Josephine Peavey.

CURATORS OF EXHIBITS OF SCIENTIFIC SPECIMENS—Pathology, W. N. Beggs; Bacteriology, W. C. Mitchell; Chemistry, Philip Hillkowitz; Hematology, A. M. Holmes.

*DELEGATES TO THE AMERICAN MEDICAL ASSOCIATION.

DELEGATES.		ALTERNATES.	
W. W. Grant,	W. M. Strickler,	Hobart E. Warren,	E. Stuver,
P. V. Carlin,	Charles Denison,	Aubrey H. Williams,	A. Zederbaum,
W. A. Jayne,	F. E. Waxham,	T. M. Burns,	W. B. Carver,
John W. Graham,	E. J. A. Rogers,	J. E. Kinney,	M. H. Dean,
Samuel A. Fisk,	H. W. McLauthlin,	G. N. Macomber,	T. J. Carlin,
J. T. Eskridge,	John Boice,	C. G. Hickey,	W. B. Craig,
A. Stedman,	S. E. Solly,	G. B. Packard,	A. L. Bennett,
L. E. Lemen,	Jesse Hawes,	F. E. Rogers,	W. S. Bagot,
W. E. Wilson,	I. B. Perkins,	A. R. Seebass,	F. A. Greedy,
Hubert Work,	Robert Levy,	W. E. Shotwell,	L. T. Durbin,
W. A. Campbell,	J. C. Blickensderfer,	J. N. Thomas,	Jean A. Gale.
P. R. Thombs,	F. H. McNaught.		

*Delegates unable to attend are expected to notify the Secretary one month before the Association convenes. The Secretary will then notify the corresponding alternate.
The President will appoint other alternates in place of those unable to attend.

Minutes of the Thirtieth Annual Convention of the Colorado State Medical Society Held in Denver, June 19, 20 and 21, 1900

TUESDAY, JUNE 19.

MORNING SESSION.

The society was called to order at 9:45 a. m., in the ordinary of the Brown Palace hotel, President J. N. Hall, of Denver, in the chair.

Invocation by Rev. W. A. Hunter.

The President: The next order of business is the reading of the minutes of the last meeting, by the secretary. Inasmuch as the proceedings were published and you are all familiar with them, we will dispense with the reading of them. We will then call for the report of the corresponding secretary, Dr. H. B. Whitney.

Dr. H. B. Whitney then reported as follows:

During the year the society has lost the following members:

By Death: E. R. Axtell, G. W. Burleigh, George Hamilton, H. F. Hazlett, R. D. Liggitt, L. O. Maffett, A. D. McArthur, S. MacAlister, L. H. Wood, J. J. Willard.

By Resignation: J. E. Cox, W. A. E. DeBeque, W. B. Fenn, C. D. Wilson, E. A. Sheets.

Dropped for Non-payment of Dues: W. Bedell, J. E. Beebe, S. A. Bonesteel, W. L. Bruner, A. M. Cheney, A. A. Clough, F. M. Collier, F. B. Crocker, W. M. Cummings, F. A. E. Disney, W. L. Freeman, Rilla G. Hay, H. H. Howland, O. C. Huffman, C. Johnson, L. MacLean, E. M. Marbourg, A. S. Mays, S. W.

Miller, W. Moore, R. L. Taylor, F. E. Warren, Josepha Williams, E. Wright.

The present total active membership is 313.

Dr. W. J. Rothwell, treasurer of the society, reported as follows:

To the Officers and Members of the Colorado State Medical Society:

Gentlemen—As treasurer of your society I beg to submit the following report:

Balance on hand June 19, 1899	$ 224 58	
Annual receipts	1,174 00	
		$1,398 58
Expenditures during the year	$1,049 20	
Cash balance on hand	349 38	
		$1,398 58

Respectfully submitted,
WM. J. ROTHWELL, Treasurer.

Dr. S. D. Hopkins then reported as follows for the executive committee:

The executive committee wishes to report that they have made several changes in the usual manner of entertainment, which they hope will meet the approval of the society. An expense of $201.50 was incurred for transportation of the two gentlemen who will deliver the addresses on medicine and surgery. Programmes were mailed to each member of the society before the meeting. We have added to the programme a pathological, bacteriological and chemical exhibit.

The committee wishes to thank each member for the liberal manner in which they subscribed to the entertainment fund.

Dr. H. B. Whitney, chairman of the publication committee, submitted the following report:

Four hundred volumes of 515 pages each were published at a cost of eighty-five cents per page. Since there was no publication in 1898, the volume of last year included also the minutes of the preceding year. It seems proper here to commend highly the work of The Smith-Brooks Printing Company, and, after

considerable experience in editing the Transactions, to call attention to the very great advantage of giving the contract to well equipped publishers instead of any of the smaller printing firms.

Respectfully submitted,

H. B. WHITNEY, Chairman Publication Committee.

Dr. H. G. Wetherill, chairman of committee on place of meeting, submitted the following report:

Your committee on place of meeting, in pursuance of a resolution passed at the last meeting of the society, has considered carefully the advisability of holding an occasional meeting of the society, about one in three or five years, outside of the city of Denver.

A careful inquiry into the matter leads to the conclusion that such a change would be an unwise one, and your committee recommends that the present arrangement be continued without change.

Upon motion duly seconded the reports heretofore made were adopted.

The following report was then made by the committee on necrology:

The committee wishes to report that death has laid a heavy hand upon our membership during the past year.

Edwin Rodarmel Axtell was born in Washington, Indiana, February 7, 1866. He graduated from the Miami Medical College of Cincinnati in 1888, and served the following year as interne in the Cincinnati hospital. He moved to Denver in 1889 and was appointed superintendent of the old St. Luke's hospital. His abilities and earnestness of purpose were early recognized by his colleagues, and he became associated almost at once with the faculty of the medical department of the University of Denver. Much of the energy of Dr. Axtell's life was devoted to the interests of this institution, which for a number of years he served as assistant secretary and secretary of the faculty, and later as professor of renal diseases.

In 1891 he married Miss Grace Coffin, formerly of Indiana, but who was at that time engaged in teaching in a Denver school. She was a faithful companion in his labors and lives to mourn him.

In his brief career Dr. Axtell left his mark in hearts and institutions. He was ever ready to give his time and talents in answer to the call of distress or for the investigation of a scien-

EDWIN RODARMEL AXTELL.

tific problem. He was a prominent donor to the Colorado Medical Library. He was a member of the staffs of the Colorado Cottage Home, of the Home for Dependent Children, of St. Luke's hospital and of the Arapahoe County hospital. At the death of Dr. Manly, in 1895, who a year before had founded the

Colorado Climatologist, Dr. Axtell assumed charge of the publication and re-named it the Colorado Medical Journal. This, his only child, continued to receive his devoted energy until his death. Dr. Axtell was prominent in the organization of the Burton Society. The promise of the future was very bright for him. Material success was just beginning to reward a decade of unselfish work when death came, death due directly to his pursuit of duty. On December 1, 1899, while making an autopsy in his role of pathologist at the County hospital, Dr. Axtell acquired an infected wound, and after days and nights of great suffering he succumbed to septicaemia on December 15.

HENRY SEWALL.

Dr. G. W. Burleigh, of Boulder, was admitted in 1896, and had been connected with the Boulder sanitarium for some years. He was a faithful servant in his chosen line of work.

Dr. George Hamilton, of La Jara, was admitted in 1896. He had filled the office of assistant recording secretary in 1897, and was favorably known in the San Luis valley.

Dr. H. F. Hazlett, of Pueblo, was admitted in 1896. He long suffered from tuberculosis, from which disease he finally died. He had been for some years the faithful assistant of Dr. Hubert Work, of Pueblo.

Dr. R. D. Liggitt, of Mosca, was admitted in 1895. Although not prominent in the work of the society he was an excellent practitioner.

Dr. L. O. Maffett, of Colorado Springs, was admitted in 1897 and served as vice president in 1899. He had served as city health commissioner in Colorado Springs, and was a promising member of the profession.

Dr. A. D. McArthur, of Littleton, admitted in 1895, died of tuberculosis, for which he came to this state after graduation at McGill University, Montreal. He was known as a conscientious physician, and leaves a wide circle of friends.

Dr. S. MacAlister, of Rocky Ford, was admitted in 1898, and gave promise of excellent work in his profession. He was very favorably spoken of by those who knew him best.

Dr. L. H. Wood, of Denver, admitted in 1885, came here for tuberculosis in 1883, and long practiced in Highlands. He was graduated at Yale Medical School in 1869, and was well known in this vicinity for his excellent work.

Dr. J. J. Willard, of Pueblo, was admitted in 1894. He received his degree from the University of Vermont in 1888. He had long practiced in Pueblo, where he was highly respected.

Dr. W. N. Beggs, chairman of the committee on medical societies, submitted the following report:

Report of the committee on medical societies:

Not knowing, and not being able to ascertain from the secretary, what medical societies are affiliated with this society, or what constitutes such affiliation, this report contains returns from all the medical societies in the state which we could obtain. The report is not complete, but the fault does not lie with us. The secretary of each medical society has been written to and information requested. From several of them no response at all has been received; some others gave only incomplete information. The societies which have been previously reported as defunct or suspended are included in this report, although they might just as well be omitted. We have no information of new societies formed.

NAME OF SOCIETY	Name of Secretary*	No. of Meetings held in 1900	Average Attendance	Present Membership	Gain or Loss in Membership in 1900	No. of Visitors	No. of Papers Read	No. of Cases Presented or Reported	No. of Specimens Presented	No. of New Instruments Shown	No. Taking Part in Discussions	REMARKS
Alumni Association of Gross Medical College (Incorporated)	Dr. A. T. Moore	5	13	..	....	..	3	10	....	....	....	Customary for all members to participate in discussions if they choose.
Aspen Medical Society	.....	....	....	..	....	..	..	....	....	....	....	Reported as defunct in 1897.
Boulder County Medical Society	.....	....	....	..	....	..	..	....	....	....	....	Reported suspended in last year's report.
Bent County Medical Society	.....	....	....	..	....	..	..	....	....	....	....	Reported defunct in last year's report.
Cripple Creek Medical Society	.....	....	....	..	....	..	..	....	....	....	....	No report last year or this.
Denver Clinical Society	Dr. Julia Seaton Kapp	14	....	25	—1	12	11	14	4	....	....	Society of Women Physicians Proceedings published in the Colorado Medical Journal.
Denver Clinical and Pathological Society	Dr. Geo. E. Tyler	9	28⅔	40	....	21	..	141	19	4	161	Membership limited to 40. No papers permitted. Proceedings published in the Colorado Medical Journal.
Denver and Arapahoe Medical Society	Dr. E. Delehanty	18	34 11/18	188	—8	..	30	21	8	1	102	Proceedings published in the Colorado Medical Journal.
Denver Medical College Alumni Association (Incorporated)	.....	....	....	..	....	..	..	....	....	....	....	No report.
El Paso County Medical Society	Dr. J. O. Reddie	....	....	..	....	..	..	....	....	....	....	No report.
Fremont County Medical Society	.....	....	....	..	....	..	..	....	....	....	....	Reported last year as suspended.
Lake County Medical Society	.....	....	....	..	....	..	..	....	....	....	....	No report.
Larimer County Medical Society	.....	....	....	..	....	..	..	....	....	....	....	Reported last year as suspended.
Las Animas County Medical Society	Dr. John R. Espey	11	5 5/11	15	+1	12	10	....	....	....	....	All present; members and visitors take part in the discussions, being called on in rotation; papers read in rotation by all members; harmony and good feeling prevail and society is beneficial; society has elected an official reporter to report proceedings to the Colorado Medical Journal.
Morgan County Medical Society	.....	....	....	..	....	..	..	....	....	....	....	No report.
Otero County Medical Society	.....	....	....	..	....	..	..	....	....	....	....	No report.
Practitioners Club of Denver	.....	....	....	..	....	..	..	....	....	....	....	Reported last year as suspended.
Pueblo County Medical Society	Dr. J. A. Black	....	....	..	....	..	..	....	....	....	....	No report; has elected Dr. Black as official reporter to report proceedings to the Colorado Medical Journal and proceedings have begun to be published in that way.
Weld County Medical Society	Dr. J. K. Miller	....	7	10	+1	5	6	....	....	....	....	As a rule all members present take more or less part in discussions.

* Name given of secretary for time covered by the report.

Following is the list of papers reported to your committee as having been read before the respective societies:

Before the Alumni Association of the Gross Medical College:

"Dyspepsia," by Dr. E. C. Hill.

"Syphilis," by Dr. S. Simon.

"Appendicitis," by Dr. A. H. Williams.

Before the Denver Clinical Society:

"Criminal Abortion," by Dr. Peavey.

"Appearances of the Tongue in Disease," by Dr. Root.

"Cystic Degeneration of the Chorion," by Dr. Hoffman.

"Influence of Food Upon the Development of the Teeth," by May E. Townsend, D. D. S.

"Incompatibles," by Miss Naley (pharmacist).

"Treatment of Leucorrhoea by the Use of Yeast," by Dr. Mitchell.

"Paranoia," by Dr. Kindig.

"Some Aural Conditions of Interest to the General Practitioner," by Dr. Gale.

"Post-Partum Gynaecological Treatment," by Dr. Bates.

"Preventive Therapeutics," by Dr. Kapp.

"Heredity," by Dr. Teele.

Before the Denver and Arapahoe Medical Society:

January 11, 1899—"A Case of Trachitis with Autopsy" ..... Dr. Minnie Love

January 24, 1899—"A New Operation for Epithelioma of Lip" ..... Dr. W. W. Grant

January 24, 1899—"Dermatitis Exfoliatioa Produced by the External Use of Chrysarobin, with Notes on Treatment" ..... Dr. J. M. Blaine

February 14, 1899—"Prevention of Smallpox in This City at the Present Time" ..... Dr. Wm. P. Munn

February 14, 1899—"Vaccination and Vaccinia" ..... Dr. H. B. Whitney

February 28, 1899—"The Relation of Some of the Neuroses to the Pelvic and Genital Diseases of Women" ..... Dr. H. G. Wetherill

February 28, 1899—"Anaesthesia and Septicaemia" ..... Dr. E. P. Hershey

March 14, 1899—"Leukemia; a Report of Three Cases" .....Dr. J. N. Hall

March 14, 1899—"Methods and Results in 175 Cases of Simple Fracture of the Femur".....Dr. C. A. Powers

March 28, 1899—"A Brief Report of Abdominal Cases During the Year 1898".....Dr. I. B. Perkins

March 28, 1899—"The Clinical Value of the Various Methods of Measuring Refraction of the Eye" .....Dr. E. W. Stevens

April 1, 1899—"An Unusual Course of Dissecting Aneurism of the Ascending Aorta".Dr. W. E. Shotwell

April 1, 1899—"The Choice of Mydriatic".....Dr. Ed. Jackson

April 26, 1899—"Gillis De La Tourette's Disease".... .....Dr. B. Oettinger

April 26, 1899—"Medical Treatment of Obstruction of the Bowels".....Dr. C. D. Spivak

May 9, 1899—"Two Complicated Cases of Appendicitis" .....Dr. S. D. Van Meter

May 9, 1899—"Hypertrophic Rhinitis in Females at Puberty and the Abuse of the Cautery in Treatment".....Dr. W. K. Robinson

May 29, 1899—"Rabies".....Dr. Chas. Greswell

October 10, 1899—"Some Considerations Regarding the Health Resorts of the West and Southwest" .....Dr. F. E. Waxham

October 10, 1899—"Mastoid Operations"..... .....Dr. W. F. Cole, of Waco, Texas

October 24, 1899—"A Note on the Reasonable Control of Tuberculosis".....Dr. C. Edson

October 24, 1899—"Contusion of the Eyeball with Rupture of the Iris and Choroid; Recovery with Normal Vision".....Dr. E. W. Stevens

November 14, 1899—"Auto-insufflation of the Stomach, with Demonstration".....Dr. C. D. Spivak

November 14, 1899—"Some Reasons Why the Eye Should Receive More Attention at the Hands of the General Practitioner".....Dr. G. M. Black

November 28, 1899—"Some Observations on the Symptoms, Complications and Treatment of Typhoid Fever".....Dr. F. W. Kenney

November 28, 1899—"The Use of Holocain in Ophthalmic Operations and Diseases"....Dr. Edward Jackson

December 12, 1899—(a) "Conical Stump After Amputation in Childhood." (b) "Excision of Entire Synovial Membrane; Recovery"—Dr. C. A. Powers

December 12, 1899—"A Preliminary Paper on the Treatment of Dipsomania".....Dr. E. P. Hershey

December 26, 1899—"Tuberculosis in Colorado, Methods of Dissemination and Means of Restriction".....Dr. Geo. E. Tyler

December 26, 1899—"On the Action of Static Electricity in Relieving Some Muscular and Arthritic Pains".....Dr. Geo. H. Stover

Before the Weld County Medical Society:

"Fecal Poisoning," by Dr. J. K. Miller.

"How Bacteria and Protozoa Produce Disease," by Dr. G. Law.

"Koch's New Tuberculin," by Dr. C. D. Nelson.

"Diagnosis of Abdominal Cancers," by Dr. R. F. Graham.

"Obstetrical Lacerations of Uterus, Vagina and Perineum, with Their Signs, Symptoms and Sequelae," by Dr. J. Hawes.

"The Medicine-Dispensing Physician," by Dr. Kearns.

Dr. Henry Sewall submitted the following report for the national committee on legislation of the American Medical Association:

While attending the Congress of Physicians and Surgeons in Washington early in May, your reporter was officially requested to represent the Colorado State Medical Society in the sessions of the national committee on legislation.

This committee had its origin in a committee of three appointed by the American Medical Association, one member being chosen from each of the cities Philadelphia, Baltimore and Washington. The original committee was empowered to add to its number by inviting the appointment of a single delegate

from each of the following organizations: Medical Department of the Army, Medical Department of the Navy, Marine Hospital Bureau and general medical society of each state and territory. At the meeting of the committee the resolution of the American Medical Association was amended to include in the personnel of the committee a representative from the Bureau of Animal Industry, and representation of the various state and territorial organizations was limited to those societies in affiliation with the American Medical Association.

It would be improper at this time to detail the proceedings of the committee meeting, but the scope of the discussions held therein embraced the following subjects:

1. The establishment of a national department of public health, and the merits of the Spooner bill now before congress.
2. The maintenance of the Index Medicus.
3. The anti-vivisection bill (Gallinger's) now before congress.
4. The unification of medical practice acts in different states.

It was voted, "The various delegates present at this meeting recommend to their individual state medical societies the appointment of a delegate to act with this committee."

I may say further that we have no information of any new societies formed except as contained in the report as read.

Dr. Munn moved that the report of the committee be received and placed on file, and that the recommendations therein made be made the subject of consideration at some future meeting when the number of members present is larger than at the present time. Carried.

Dr. Sewall also moved that this society appoint a delegate to act with this committee of national legislation.

Upon motion of Dr. Jackson, duly seconded, the report was accepted and the resolution adopted.

The President: The secretary has a communication bearing upon this point, and I think the two matters can be taken up at the same time.

The Secretary: Mr. President, I have this communication:

Detroit, October 25, 1899.

Secretary Colorado State Medical Society, Denver:

Dear Doctor—Permit me to call the attention of your society to the movement desiring to attain the establishment of interstate reciprocity concerning the license to practice medicine.

Very satisfactory preliminary answers have been received by authorities of the vast majority of the states and territories.

Editorials on the subject, in connection with the action of our society, have been noticed in the New York Medical Journal, August 12 and October 21, 1899; the Physician and Surgeon, Ann Arbor, July, 1899; the Journal of the American Medical Association, September 20, 1899; the New York Medical Times, September, 1899; the Virginia Medical Semi-Monthly, October 13, 1899; the New York Medical Record of October 14, 1899, contained a gratifying notice on the subject. The movement has, so far, been endorsed by the state medical societies of Idaho, Utah and Vermont, and by the Detroit Medical and Library Association. The latter and the Utah State Medical Society appointed committees to assist our committee.

Our efforts met with approval also from other sources.

The Illinois state board (Journal of the American Medical Association, October 14, 1899, page 990) already took a step forward along the line suggested.

We take the liberty to ask your society to endorse and to further the movement in any way the society thinks best.

Kindly accept, in advance, our thanks for your trouble. Very respectfully yours,

E. AMBERG, M. D.,
Secretary of Committee.

On motion, duly seconded, it was voted to endorse the above movement.

Dr. Sol G. Kahn, chairman of committee on medical ethics, submitted the following report:

To the President and Members of the Colorado State Medical Society:

We, your committee on medical ethics, beg leave to report that there have been no infringements of medical ethics brought

to the notice of the committee during the year, and we have had no one to act on or to sit on.

On motion, duly seconded, the report was received and placed on file.

Dr. Munn: Mr. President, I want to make a motion in line with one recently adopted by the Arapahoe Medical Society, that the secretary of this society be authorized to purchase a sufficient number of copies of the code for each member of this society. This motion is made in view of the fact that each member pledges himself to the code of ethics of the American Medical Association.

The motion, being seconded, was carried.

Dr. J. Tracy Melvin, chairman of committee on pharmacopial revision, then presented the following report:

To the Officers and Members of the Colorado State Medical Society:

Your committee to the convention for revising United States Pharmacopia, would respectfully submit the following report:

That pursuant to the rules of that convention your committee submitted certain recommendations regarding the scope of the proposed revision, sixty days prior to its meeting. These recommendations had in view such changes as would, in our judgment, make the work of more practical value to the physician, as well as to the pharmacist. They were as follows:

1. That general formulas for each *class* of preparations be introduced, instead of special formula for each article, the latter being discarded whenever practical.

2. That a further effort be made to secure uniformity of drug strength in all tinctures and other galenical preparations, so that, for example, tinctures with few exceptions should represent 10 per cent. or 20 per cent. of the drug, by weight.

3. That maximum safe doses be introduced for each official, the intentional exceeding of which should be assured by the prescriber placing an exclamation mark after the item. This has been for years advocated by many, as affording a great protection to the physician, the pharmacist and the patient.

4. The publication of a supplement by the revision committee at shorter intervals between complete revisions.

5. The standardization of all active drugs and their preparations by chemical or physiological means.

6. The introduction of serums.

Your committee was represented at the sessions of the convention in Washington by its chairman.

At these sessions a decided difference of opinion existed upon these and other points, between the representatives of the fourteen state medical societies and those of the forty or more colleges and associations of pharmacy.

It is to be regretted that the medical profession of the country had not become more fully aroused to the importance of this convention and the opportunity it would have afforded to obtain changes in the forthcoming revision which we have long desired.

The instructions to the committee of revision, which was composed of twenty-five members, who were men eminent as teachers in the various branches of pharmacy, and to whom was referred the detail work, provided for the following changes:

1. For the addition of synthetized products of definite, known composition, not patented.

2. For the introduction of *average* doses for each remedy.

3. For the assay and standardization of all drugs, where practical, by *chemical* means.

4. For general formulae in all preparations not specified.

5. For the issuing of a supplement at short intervals during the decennial period.

We therefore have every reason to believe that while this work may not fully represent the advanced condition of therapeutics of to-day from the physician's standpoint, it will be in every respect in advance of previous revisions.

J. TRACY MELVIN,
Chairman Committee on Pharmacopial Revision.

It was voted that this report be accepted.

There being none of the chairmen of the other committees present and ready to report, the society proceeded with the scientific program. The first paper presented was by Dr. W. W. Reed, of Fowler, on "The Influence of Myth and Superstition in the Science of Medicine," which was followed by a paper on "Early Correction and Educative Treatment of Convergent Strabismus," by Dr. W. C. Bane, of Denver. The latter paper was

discussed by Dr. E. W. Stevens and Dr. Edward Jackson. Dr. Bane then exhibited and explained the use of the sideroscope, an instrument for the detection of iron or steel in the eye. Remarks upon the use of the sideroscope were also made by Dr. G. M. Black.

The next papers read were "The Rational Treatment of Abortion in Country Practice," by Dr. J. W. Cline, of Georgetown; "Helps in Refraction," by Dr. Melville Black, of Denver; and "Headache due to Eye Strain, and its Treatment," by Dr E. W. Stevens, of Denver, which were discussed by Drs. Edward Jackson, of Denver; C. K. Mills, of Philadelphia, and G. M. Black, of Denver.

The society here took a recess until 2 o'clock.

AFTERNOON SESSION.

The society was called to order by the president at 2 o'clock.

Dr. Hopkins, for the executive committee, announced that the members from out of town did not seem to understand that the tickets for the entertainment for to-night and to-morrow night are free to them, and wished them to call on the executive committee and get their tickets in order that the committee might complete the arrangements.

Dr. Tyler moved that a nominating committee be appointed to-morrow morning just before the address of Dr. Mills.

The motion, being duly seconded, was carried.

The following report of the committee on legislation was read by the secretary:

Your committee on legislation have little of moment to report. As the legislature has not met since our appointment, nothing could be accomplished in the way of legislation. The sentiment of the profession was crystallized in the act passed by the last legislature, which met with executive disapproval. We would suggest that the committee on legislation appointed by your successor endeavor to procure the passage of the same or a similar act by the next legislature. We would also recommend that the members of this society enter into politics to the extent of securing pledges from the candidates for the next

legislature. Concerted action by every member of this body during the coming campaign would, we believe, do much to secure the passage of a law that would be satisfactory to the medical profession in this state, and that would give legitimate medicine and the public a measure of protection not now enjoyed.

Respectfully submitted,

J. R. ROBINSON, Chairman.

Dr. Stedman: Mr. President, there are two gentlemen living in town to-day who are identified with the early history of this society, both of whom have retired from active practice, both having been presidents of this society. I refer to Dr. H. A. Lemen and Dr. W. R. Whitehead. I wish to move you that these two gentlemen be withdrawn from the active list of our society, and that we extend to them the honor of honorary membership, keeping them in touch with the society, and showing them the appreciation in which we hold them. I think both these gentlemen have good standing in the society, so far as having paid their dues and having conformed to the rules of the society.

Motion carried unanimously.

Dr. A. M. Holmes made the following report: Mr. President, in making up a report of the pathological exhibit at Atlantic City, I had no idea of making this report, and it was done in a very short time. I might say that the exhibit at the recent meeting of the American Medical Association was conducted on the same general plan as primarily adopted by the state society of Indiana, except on a larger scale. The chief promoter of this department is Dr. Frank B. Wynn of Indianapolis. I was impressed with the plan and scope of the plan presented. The chief work was from the state societies, colleges and hospitals.

REPORT ON THE PATHOLOGICAL EXHIBIT AND DEPARTMENT OF PATHOLOGY, ATLANTIC CITY, N. J., JUNE 5-8, 1900.

BY A. MANSFIELD HOLMES, M. D., DENVER, COLO.

Having had the honor of representing this society in the pathological exhibit at the recent meeting of the American Medical Association, I wish to briefly report:

It affords me pleasure to state that the department of pathology developed into one of the chief attractions of the convention. The exhibit was conducted on the same general plan as

was primarily adopted by the State Medical Society of Indiana at the Columbus meeting, except on a much larger scale. The chief promoter of this excellent department, as is well known, is Dr. Frank B. Wynn, of Indianapolis. Much credit is due Dr. Wynn for his untiring efforts in developing the department of pathology to its present state of perfection.

The representation was chiefly from state medical societies, colleges, hospitals, and individuals. Among the principal exhibitors were: The Indiana State Medical Society; Pathological Society of Louisville, Ky.; Bellevue Hospital; New York Pathological Society; Pennsylvania University and Jefferson Medical College; United States Marine Traveling Laboratory; Department of United States Animal Industry (diseased meats), Washington, D. C.; Colorado State Medical Society.

The method of classifying material was excellent. The following summary will represent the nature of the classification and the scope of the exhibit. This summary was kindly furnished to me by Dr. Wynn:

Diseases of the Eye, Ear, Etc.	Cultures.
Gross specimens	91
Mounts in gelatin	85
Photographs	18
Photography.	Cultures.
Miscellaneous	82
Insane	500
Criminal	42
Dermatology.	Cultures.
Gross specimens	2
Histopathology	27
Bacteriology	20
Photomicrographs	18
Photographs	44
Diseased Meat.	Cultures.
Specimens	97
Retrogressive and Progressive Tissue Changes.	Cultures.
Gross specimens	14
Photographs	8

Disturbances of Development.	Cultures.
Specimens	3
Photographs	3
Blood and Blood Making Organs.	Specimens.
Ductless glands, etc.	12
Circulatory system	29
Respiratory system	15
Gastro-intestinal	83
Genito-urinary	91
Reproductive organs	25
Nervous System.	Cultures.
Gross specimens	25
Brain sections	9
Infiltrated wax brains	12
Photographs of pathological brains	43

Sanitary Science.

Traveling bacteriological laboratory for clinical purpose—	Cultures.
Icteroides	16
Plague	16

The method of identifying material, with history and data of the exhibit, made it possible to gain much information from a visit to the department.

Labor-saving devices, improvements in laboratory technique, and a display of instruments of precision in laboratory study, were not a small part of the exhibit.

Objections were made by members of the section of practice of medicine, that if the department of pathology should be established, subjects naturally belonging to internal medicine might be removed from the section to which they naturally belong. It has been recognized at the meetings of the American Medical Association that the same subject is frequently treated in several sections. Frequently these subjects are treated at the same hour by two or more sections, thus preventing those interested in a particular subject from hearing valuable papers and their discussions. To overcome this difficulty the symposium plan is growing in favor.

As a result of the enthusiasm over the recent pathological exhibit, the department of pathology was strongly recommended and was made a department of the association. It, however, seems to be the desire of many that the papers admitted to this department should be limited to technical subjects.

It is the purpose of the section on pathology of the American Medical Society to work through the state medical societies. I, therefore, feel that it is the proper time for the State Medical Society of Colorado to take active steps in coöperating with this excellent movement. Much valuable material is wasted each year by our members. With a little systematic work on our part this waste can be prevented. I should like to see some action taken on this point by our society.

The example instituted by our worthy president, Dr. Hall, should become a permanent feature of the society, and hereafter our State Medical Society should take pride in being represented at the national exhibit. I would suggest that a department of pathology be established as a branch of our State Medical Society; also that the president of the society should be empowered to appoint a committee on pathology, to collect, and properly care for, the material that is now so generally wasted.

With a little systematic effort on the part of our society and its individual members, we may soon be proud of a pathological collection that will be of interest and instruction to every progressive physician and surgeon in our state. Choice specimens from this collection may be selected each year and represented at the annual meeting of the State Medical Society, and at the annual meeting of the American Medical Association.

The first paper on the program was then called for, "'Dysmenorrhea, with Report of Cases," by Dr. M. C. T. Love, of Denver.

The next paper was read by Dr. A. L. Bennett, of Denver, whose subject was "Some Medical and Surgical Experiences in Equatorial Africa."

The next paper, "Degenerative Results of Defective Heredity," by Dr. Chas. Denison, was discussed by Drs. A. Stedman, J. N. Hall, and Wm. P. Munn.

The following papers were then read: "The Diagnostic and Therapeutic Value of Insufflation of the Œsophagus and Stomach," by Dr. C. D. Spivak, of Denver; "The Digestive Disturbances of Pulmonary Tuberculosis: Their Causes and Importance," by Dr. C. B. Van Zant, of Denver, which papers were discussed by Drs. G. E. Tyler, of Denver, and Perce.

The next paper, "Some Pathological Conditions Characterized by Yeast Fungus," by Dr. C. G. Hickey, of Denver, was discussed by Drs. W. C. Mitchell of Denver, Frank Finney of La Junta and G. W. Miel of Denver.

The next paper on "The Treatment of Consumption by Cinnamic Acid," by Dr. A. Mann, was discussed by Dr. Chas Denison of Denver.

On motion, duly seconded, the convention adjourned until 9 o'clock a. m.

WEDNESDAY, JUNE 20.

MORNING SESSION.

The convention was called to order by the president.

Dr. C. K. Fleming: Mr. President, I have a matter I would like to bring up here at this time. It is the matter of a bill of the committee for preparing a bill for the legislature, and inasmuch as it was not brought up and acted on at the last meeting, I move that this bill be taken up and paid.

The motion was duly seconded and carried.

The first paper presented was that of Dr. R. F. Graham, of Greeley, whose subject was "Diabetes Mellitus; Report of Cases."

This paper was discussed by Drs. E. C. Hill, of Denver, Henry Sewall, of Denver, and discussion closed by Dr. Graham.

The next paper read was by Dr. Jesse Hawes, of Greeley, on "Guaiacol in Frequent, Painful Urination," which was discussed by Drs. W. B. Davis, of Pueblo, and Wm. P. Munn, of Denver.

Dr. Henry Sewall, of Denver, next submitted a paper on "Preliminary Note on the Relation of the Form of the Tubercle Bacillus to the Clinical Aspects of Pulmonary Tuberculosis," which was discussed by Drs. W. C. Mitchell, of Denver, E. C. Hill, of Denver, and W. N. Beggs, of Denver.

The President: There are one or two matters of routine business to be disposed of. Dr. Fleming tells me that the two members of the committee on admissions from out of town are not here, and I think you should nominate two members to serve upon that committee.

Drs. John Law, of Leadville, Jesse Hawes, of Greeley, and J. W. Cline, of Georgetown, were placed in nomination.

Dr. Hawes asked to be excused, and the nominations being closed a motion was made that the secretary cast the vote of the society for the two gentlemen named. Carried.

The President: We should have had a report from Dr. Powers yesterday for the committee on pathological laboratory. He is present, I think, at the present time.

Dr. Powers: The committee on the establishment of a laboratory consisted of Drs. Jayne, Freeman, Jackson and Fenn. Dr. Jayne has been out of town; Dr. Fenn has not been up here from the Springs, and the present report was adopted by Dr. Freeman, Dr. Jackson, and myself, and is as follows:

The committee authorized at your last meeting to inquire into the matter of a central laboratory of pathology in Denver, begs leave to report as follows:

A very considerable number of physicians have been conferred with regarding this matter, and in an unofficial way representatives of the Denver College of Medicine and of the Gross Medical College have been consulted.

Such a plan as that proposed last year obviously had advantages and disadvantages. On the former side it may be said that with a well established laboratory of pathology in Denver there would be a tremendous increase in the amount of pathological work done in the city and in the state, and it would doubtless permit this work to be accomplished in a more exhaustive and thorough way. We all feel greatly indebted to the self-sacrificing work of those gentlemen who have during the past few years contributed so much to our laboratory resources, and we can hardly fail to recognize that laboratory workers should receive definite salaries; one at least should be so well paid as to enable him to devote all of his time to this work without thought of engaging in the practice of medicine. The establishment of a pathological and bacteriological laboratory would undoubtedly serve as a forceful stimulus to our clinical workers, and your reporter is very much impressed by this thought after recent examination of laboratory methods in Eastern cities and after personal conversation with Councilman of Boston, Prudden of New York and other eminent men in this field of work.

That there are certain objections to the establishment of such a laboratory as that proposed can not be denied.

(1) It would take a certain amount of income from the purses of worthy and competent gentlemen now working individually in this field.

(2) Should each of the two medical schools in Denver send its students for instruction to this laboratory, the school would to a very great degree lose definite control over its students in this special department.

(3) The expense attending this laboratory would be considerable. I have estimated that it could not be maintained for a sum less than $3,000 to $4,000 per year. This would allow a salary of $2,000 to the director and $2,000 more for assistants and general maintenance.

Your committee is of the firm belief that a laboratory can not be established and conducted without the willing coöperation of both of our Denver medical colleges. It does not seem to your committee that this coöperation can be obtained at present.

On motion of Dr. W. E. Wilson, duly seconded, the report was received and placed on file.

Dr. Powers: Mr. President—The Medical Society of the State of Colorado is composed of active and honorary members. We have an active membership, according to the last report, of three hundred and twenty-six. Our honorary membership is limited to seven, and of these but one, Dr. D. H. Dougan, is a resident of our state.

Three ex-presidents of our society, each of whom has retired from the practice of medicine, are on our active list. These are Dr. W. F. McClelland, who joined the society in 1871—the year, I believe, of its organization; Dr. W. R. Whitehead, who became a member in 1873, and Dr. H. A. Lemen, who united with it in 1874. All of these are distinguished men in the medical annals of our state, and it seems right and fitting that each should be transferred from the active list to the honorary list.

I move you, sir, that Dr. W. F. McClelland, Dr. W. R. Whitehead and Dr. H. A. Lemen be placed on the honorary list of this society.

The President: A two-thirds vote of the society is necessary to carry a motion of this character. We have already considered this question as to two of these gentlemen, and the only one to be considered at present is Dr. McClelland.

Dr. Sewall: I would like to move that the name of Dr. Bancroft be also placed on this list of honorary members.

The motions, being duly seconded, were unanimously carried.

Dr. Chas. H. Call, of Greeley, chairman of the committee on sanitation and preventive medicine, submitted the following report:

Mr. President and Fellow Physicians—First we wish to commend the Colorado State Board of Health for the past year, especially for its action toward the dissemination of knowledge about tuberculosis, tuberculous cattle, and danger from infected milk, etc.

Although they have done much, yet very much more remains to be done toward the prevention of this one dread disease, which makes up from ten to fourteen per cent. of our death roll.

We believe, by a continuance along the same line, spreading out as occasion offers, all is being done that is advisable under existing circumstances.

Any legislation without public approval and the enforcement of public opinion always has been, and will be for some time to come, at least, dead letter laws.

Consequently, many legislative acts which would meet our approval have to be held in abeyance until the time when the people will realize the danger of infection from its various sources, and insist that something be done to put a stop to its spread, such as putting consumptives apart by themselves; keeping everything disinfected that comes in contact with them; seeing that tuberculous subjects expectorating on streets, in cars, etc., meet with a punishment at least in proportion to its dangers; that all infected cattle be either condemned or isolated; that a person selling milk from dangerous cattle be properly punished; and many more which will be needed before we can be said to have this one preventable disease even under the semblance of control.

These various acts can be brought about and made effective only by the slow process of education, not of the legislature alone, but of the masses, and then the people will aid rather than oppose the actions of health boards.

The members of the various local boards of health are without a doubt conscientious men, but they are often deterred from enforcing law by local public opinion, and probably this is

the chief reason why our sanitary laws at present are not more rigidly enforced.

To obtain the best results of preventive medicine it is necessary to raise to the highest standard possible and to educate to the greatest degree the public as a whole.

To a certain extent and among a certain few this is an easy matter, but for the people whose ignorance and prejudice have to be overcome, all physicians recognize the difficulty.

The relation of the physician to over ninety per cent. of the disorders of infancy and childhood may be summed up in the one word "Hygiene." In order to reduce this percentage, the question of educating the coming generation is our greatest stronghold. The easiest and probably best way to do this is through our public schools, which have been in the past the largest factor as a means of spreading contagious diseases throughout a community. In fact, as has been said, public schools may be called a great juvenile board of trade, where exchange of infections and their products may be effected and contagion disseminated.

To change this and make the public school a health-giving as well as an educational institution, Boston, five years ago, Chicago, and other cities during the past year, have undertaken a plan of medical inspection, appointing able and competent men, acting as agents for the board of health, to daily visit their schools, inspect all children not feeling well, and, when desirable for the child's good or the welfare of the others, send the little one home to its own physician. They sustain the responsibility of the return to school of a child who has had any contagious disease, or been exposed to any; they advise as to ventilation and sanitation; they decide as to the fitness of certain children physically weak; and by this means the percentage of disease has been greatly reduced and many promising epidemics stopped.

This inspection, wherever it has been tried, has given general satisfaction, but the one main factor, which from a hygienic point of view is more important than this statistical showing, is the results for the future—namely, the education of the coming generation to look after their own and their children's health.

And by this means we can soon have many operative sanitary laws which if made at the present time would be absolutely inoperative.

Dr. G. E. Tyler: Mr. President, I move you that we proceed with the nomination of a nominating committee, and I would nominate Dr. Frank Finney as chairman of that committee. Carried.

Dr. Thomas: I would nominate Dr. Sewall as a member of that committee.

Dr. Grant: I nominate Dr. Tyler.

Dr. Black: I would like to nominate Dr. Hawes, of Greeley.

Dr. Stevens: I nominate Dr. Kahn, of Leadville.

Dr. Stover: I would like to nominate Dr. Hershey.

Dr. Fleming: I move that the nominations be closed. Carried.

The President: Please prepare your ballots. Drs. Stevens and Little will act as tellers and collect the ballots. We will vote for five of those nominated. This is a committee of five to nominate a list of candidates to be balloted upon for officers for the coming year.

The ballots being taken and counted, Drs. Finney, Sewall, Tyler, Hawes and Kahn were declared elected.

The President: That committee will report to-morrow afternoon the nomination of officers.

All wise men come from the East—in fact I know that, because I come from the East myself—and the committee have selected as one of the wise men from the East to address the convention, Dr. C. K. Mills, of Philadelphia. (Loud and continued applause.)

Dr. Mills then delivered an address on "Some Medico-Legal Experiences and Reflections."

The President: As it is now 12:30, there are two papers we failed to reach this morning. There is also a paper of Dr. Kickland, of Fort Collins, which should have been on the program; it is not on, but we will let it be placed on the program and read at some future hour. It is on "Scarlet Fever and Quarantine."

Dr. Eskridge: Mr. President, I move that a vote of thanks be given by this society to Dr. Mills for the able address with which he has favored us, and that a rising vote be taken.

The motion being duly seconded, the vote was unanimous.

The society then took a recess until 2 o'clock.

AFTERNOON SESSION.

The convention was called to order by the president.

The program for the afternoon was a "Symposium on Syphilis." All of the papers were read before any discussion was had, as follows:

"Modes of Infection," by Dr. E. P. Hershey.

"Problems in Diagnosis of Initial Lesion," by Dr. W. B. Davis.

"Bacteriologic Theories and Possibilities," by Dr. W. C. Mitchell.

"Cutaneous Manifestations," by Dr. J. M. Blaine.

Tertiary Manifestations—

(a) "The Brain," by Dr. J. T. Eskridge.
(b) "The Eye," by Dr. Edward Jackson.
(c) "The Ear," by Dr. P. F. Gildea.
(d) "The Nose," by Dr. R. Levy.
(e) "The Throat," by Dr. T. J. Gallagher.
(f) "Bones and Joints," by Dr. W. W. Grant.
(g) "Lungs, Heart and Vessels," by Dr. H. B. Whitney.
(h) "Abdominal Viscera," by Dr. H. Sewall.

"Inherited Syphilis," by Dr. Sol G. Kahn.

"Is Syphilis Ever Actually Cured?" by Dr. Frank Finney.

"Prophylaxis," by Dr. E. Stuver.

"Influence of Syphilis on Trauma," by Dr. Leonard Freeman.

"Syphilis in the Armies of the World," by Col. H. Lippincott, Surg. U. S. A.

"Treatment," by Dr. Wm. P. Munn.

On motion of Dr. Jackson, a rising vote of thanks by the society was given Dr. Lippincott for the paper submitted by him.

On motion adjourned until 8 o'clock p. m.

EVENING SESSION.

The convention was called to order by the president.

Dr. Wm. P. Munn, of Denver, submitted a paper on "State Medicine," which was loudly applauded.

Dr. Wetherill moved, seconded by Dr. Hershey, that the society extend a vote of thanks to Dr. Munn for his very excellent address on state medicine, and that five thousand reprints be made, from the transactions of the society, for distribution under his direction. Carried.

On motion the convention adjourned until 9 o'clock a. m.

THURSDAY, JUNE 21.

MORNING SESSION.

The convention was called to order by the president.

The first matter on the program was the paper of Dr. W. T. Little, of Canon City, on "The Symptoms, Prognosis and Treatment of Gastric Ulcer." The paper was discussed by Drs. C. D. Spivak and O. J. Pfeiffer.

This was followed by papers by Dr. H. T. Pershing, read by Dr. Delehanty, on "Localization of Bullet Wound of Spinal Cord, and Removal of Bullet from the Spinal Canal," and by Dr. F. H. McNaught, of Denver, on "Report of Treatment of Fractured Patellae by Operative Measures." The paper of Dr. H. W. McLauthlin on "Immunization for Typhoid Fever" was also read, and the papers were discussed by Drs. Mills, Mitchell and Edson.

Dr. Levy: Mr. President, before we proceed with the regular program, I have received a circular from Dr. Gould, chairman of the Association of Medical Libraries, asking that this society prepare a certain number of copies of the proceedings of this convention and appropriate them to the Medical Library Association for distribution through the United States, and I move that the recording secretary send as many copies of this year and also of past years as can be spared for distribution.

Dr. Spivak: We all know when Dr. Gould was here in '98 he spoke of this matter, and afterwards sent to our library all his works gratis, and he also sent works to the library of the Pueblo county society and also to the one in Colorado Springs—all are members of this association—and I hope the society will grant the request of Dr. Gould, and send him fifty copies of the proceedings of this society.

The motion, being seconded, was carried.

Dr. Edson: Mr. President, there is a matter that I desire to bring before the convention with reference to tuberculosis. While some physicians believe it is practical, others do not; but

I move the following resolution: That there be added to the list of standing committees, to be annually appointed by the president of this society, a committee on tuberculosis in Colorado, which shall annually prepare and submit to the society a report upon the prevalence of tuberculosis in this state, and the various problems connected therewith; provided that the secretary of the State Board of Health and the health commissioners of Denver, Colorado Springs and Pueblo shall be honorary members of such standing committee, if they are individually members of this society. Carried.

Dr. C. D. Spivak, chairman of the committee on literature for the education of the public with regard to quackery, presented the following report:

We, the undersigned committee, appointed at the last annual meeting of the society, after due deliberation, beg to submit the following recommendations:

First—We recommend that this society appropriate the sum of twenty-five dollars, to be awarded in prizes by a committee of three appointed by the incoming president, for the best essays pointing out the dangers to the public health and morals, especially to the youthful members of the community, from quackery as promulgated by public advertisements.

Such essays, if deemed satisfactory to the committee of award and suitable for popular distribution, should be published by said committee of award in one or more medical periodicals, and reprints of same furnished to the members of this society for gratuitous distribution.

Second—We recommend that the secretary of this society send out a circular letter to the editors of all medical periodicals published in the United States, requesting them to publish, from time to time, a list of lay periodicals whose columns are free from advertisements tending to deceive and debase the public by the promulgation of quackery.

Third—We recommend that this society send the following letter:

The Colorado State Medical Society to the Colorado State Editorial Association—Greeting:

The evident lack of censorship on the part of the daily and weekly press of advertisements tending to encourage bestiality,

criminal lust and the commission of the crime of abortion, together with the purpose on this society's part to lessen as far as possible the unhealthful and injurious effect of quackery, especially upon the young, leads it to call your attention to the fact of the grossly immoral and health-injuring character of advertisements which are accepted for publication by newspapers of today. It is assumed that carelessness rather than wilful intent on the part of a calling endowed with higher and nobler purposes, is to blame for this state of affairs.

This society therefore respectfully and earnestly recommends and requests that you take up and discuss this matter, and establish for objectionable advertisements a limit beyond which newspapers and periodicals represented in your association can not go and remain in good standing.

Wishing to hear from you on this matter, and assuring you of our cordial desire to aid as we may be able to do in this work, we remain, yours respectfully,

THE COLORADO STATE MEDICAL SOCIETY.
Respectfully submitted,
EDWARD JACKSON.
CHAS. DENISON.
SOL G. KAHN.
C. D. SPIVAK, Chairman.

On motion of Dr. McLauthlin, the report was read and acted on section by section, after which the report was, upon motion, adopted.

Dr. Tyler made an announcement that, inasmuch as several members of the society had inquired for copies of the circular on Tuberculosis issued by the State Board of Health, he had provided a number of copies, which could be obtained upon application.

Dr. Spivak: Mr. President, I have had a little experience this past winter with reference to the publication of the history of medicine in Colorado. The County Society is now thirty years old, and that was the father of this society, and the very first year the County Society was organized they took steps to organize a State Society, and we can celebrate our anniversary together, at the same time. And in order to prevent schemers and

publishers taking into their hands the publication of the book or anything of the kind, I would move you, Mr. President, that this society appoint a committee on the history of medicine in Colorado. Carried.

Dr. E. J. A. Rogers next submitted a paper on "Report of Surgical Cases," and presented before the convention two cases in which he had performed operations. The paper was discussed by Drs. Freeman and Powers.

The President: If there is no objection, we will now take up the business set for this hour, and I take great pleasure in introducing to you one whom most of us know and whom many present remember as an instructor, Dr. Chas. B. Nancrede, of Ann Arbor, Mich. (Applause.)

Dr. Nancrede then delivered an address on surgery.

Dr Powers: Mr. President, I move you that a vote of thanks be tendered by this society to Dr. Nancrede for this most interesting address to which we have listened, and I also move you that the names of Dr. Nancrede and Dr. Mills be placed on the honorary list of this society.

Seconded and carried unanimously by a rising vote.

The president announced that the chairman of the committee on membership wished the names of every candidate for membership in the society, as the list had to be presented to the printer in order to have them printed.

The president also announced that Dr. I. B. Perkins was to operate at the County hospital at 12 o'clock, performing abdominal operations, and all members of the society were invited to be present.

The papers of Dr. F. E. Waxham on "Pulmonary Embolism, with Report of Case;" Dr. G. E. Tyler, on "The Relations of State and Local Boards of Health to Diphtheria Outbreaks;" and Dr. C. B. Lyman, on "Fracture of the Humerus, Complicated with Dislocation of the Shoulder Joint, with Report of Cases," were then submitted.

The President: I will call for the papers of Dr. Powers on "Cases in Clinical Surgery;" Dr. Wetherill, on "The Prevention and Treatment of Puerperal Septicaemia;" Dr. Lemen, on "Extra-Genital Chancres and Their Recognition;" Dr. McNaught.

on "Report of Treatment of Fractured Patellae by Operative Measures," and those will all be read by title and turned over to the publication committee.

On motion of Dr. Tyler, a recess was taken until 2 o'clock p. m.

AFTERNOON SESSION.

Convention called to order by the president.

The President: The first paper of the afternoon is that by Dr. H. B. Whitney.

Dr. H. B. Whitney submitted his paper on "The Conservative Treatment of Appendicitis," which was followed by the paper on "Appendicitis, When to Operate," by Dr. I. B. Perkins.

These papers were discussed by Drs. Powers, Freeman, Beggs, Grant and Pfeiffer.

Dr. Tyler: Mr. President, I move you that Drs. Whitney and Perkins be allowed to close the arguments and that we then proceed with the business of the afternoon.

The President: I think that is a good motion, but I also think we would all like to hear from Dr. Nancrede upon this question.

Dr. Nancrede: What is the question?

The President: Whether to operate or not to operate, and when to operate.

Dr. Nancrede: I think that depends upon the case, sir. (Laughter.)

Drs. Whitney and Perkins then closed the discussion.

The President: The hour of 3 o'clock is set for the president's address, and as that hour has arrived, if the members present will come up forward, and the vice president will take the chair, we will proceed with that.

The president then delivered his address, taking for his subject "The Diseases of the Bronchial Glands."

The President: The next order of business is the election of officers, and we will first take up the matter of the election of new members.

Dr. Tyler: I desire to move that honorary membership be conferred upon Dr. Lippincott, of the United States army.

Carried unanimously by a rising vote.

The president announced that many of the members complained because they had not received copies of the proceedings of the last convention, and stated that it was doubtless due to the fact that they had changed their address or the secretary did not have their correct address, and requested all members to give their address to the corresponding secretary.

Dr. Wetherill: I feel that I owe the society an apology for having had my name appear upon the program for a paper which was prepared with considerable care. It should have been ready yesterday morning, but it was in the hands of the stenographer until it was too late, and came in too late for presentation. Afterwards the paper was called for and I was not here at the time. I want to thank the society for having the paper read by title. I would like to retain the paper, however, and make some changes in it and present it at another time.

Dr. Fleming: The committee on membership would like to recommend Dr. Z. H. McClanahan, of Colorado Springs, for membership in the society. The application has just been presented.

Dr. J. M. Perkins: I move that the secretary cast the vote of the society for that one name. Carried.

The secretary cast the vote and announced the election of Dr. Z. H. McClanahan, of Colorado Springs, to membership in the society.

Dr. Fleming: Your committee on admission respectfully submit and recommend for membership in the Colorado State Medical Society the following named applicants:

Dr. G. E. Alexander.....Castle Rock, Colo.
Dr. J. H. Cole.....Leadville, Colo.
Dr. C. R. Hally.....Fort Collins, Colo.
Dr. Smith McMullin.....Castle Rock, Colo.
Dr. Marion Burke.....Colorado Springs, Colo.
Dr. H. W. Wilcox.....Silver Plume, Colo.
Dr. B. I. Johnson.....Denver, Colo.
Dr. George Atcheson.....Idaho Springs, Colo.
Dr. J. A. Wilder.....Denver, Colo.
Dr. Elsie R. Mitchell.....Denver, Colo.
Dr. Mary E. Bates.....Denver, Colo.
Dr. W. H. Riley.....Boulder, Colo.

The candidates for membership were then balloted for and were declared elected.

Dr. Frank Finney: Your committee on nominations beg leave to make the following report of names for the various offices. I will state that it has been customary for the committee on nominations to present the names of three members for president, three for vice president, two for recording secretary, assistant two, treasurer two, a full board of trustees and committee on admissions.

The committee presents the following names:

For President—

Dr. E. C. Rivers, Dr. Wm. P. Munn, and Dr. H. W. McLauthlin, all of Denver.

For First Vice President—

Dr. W. W. Reed, Fowler; Dr. R. F. Graham, Greeley.

For Second Vice President—

Dr. W. T. Little, Cañon City; Dr. J. C. Chipman, Stirling.

For Third Vice President—

Dr. Wm. Dow, La Junta; Dr. Sard Wiest, Longmont.

For Corresponding Secretary—

Dr. H. B. Whitney, Denver; Dr. C. B. Conroy, Denver.

For Recording Secretary—

Dr. M. C. T. Love, Denver; Dr. Laura L. Liebhardt, Denver.

For Assistant Recording Secretary—

Dr. W. A. Kickland, Fort Collins; Dr. S. D. Hopkins, Denver.

For Treasurer—

Dr. W. J. Rothwell, Denver; Dr. T. J. Gallaher, Denver.

Trustees—

Drs. J. T. Eskridge, A. Stedman, W. E. Wilson, S. E. Solly, E. J. A. Rogers, H. Work, J. N. Hall.

Committee on Admissions—

Drs. S. G. Kahn, C. K. Fleming, C. A. Powers, D. F. Dayton.

I am authorized to state for the gentleman who proposed Dr. E. C. Rivers' name to the committee, that Dr. Rivers positively declines to be considered as a candidate.

The President: You have the list before you. The candidates for president are Drs. Munn and McLauthlin.

Dr. McLauthlin: No one, Mr. President, can receive the nomination to the office of president of this society without feeling honored and gratified. I have another candidate—a man to whom the profession and the whole people of the state of Colorado owe a debt of gratitude, and I would esteem it an additional honor to be permitted to withdraw my name from the list of candidates, and I ask that the secretary be requested to cast the vote of the society for Dr. W. P. Munn. (Applause.)

Dr. Wetherill: I would like to say a word with reference to the withdrawal of Dr. Rivers' name. Nearly every member of this society knows that he has been intimately connected with it for a great many years; that his interests have been with this society; and he has esteemed it an honor to be nominated for this position. It is also known that he has never been an aspirant for office in this society, and there has never been a time when he would consent to have his name presented for office in the society. He was nominated this time by his friends with the hope that this objection on his part might be overcome, but that hope was found to be futile. He positively resisted and refused. We all know that he is a very modest man and he has felt that there have been many others in the society who have deserved the honor very much more than he has deserved it, and Dr. Rivers feels that the time is not ripe for him to accept the nomination under these conditions.

The motion of Dr. McLauthlin, being seconded, was unanimously carried, and the secretary announced that she cast the ballot of the society for Dr. Wm. P. Munn of Denver, for president.

The President: I will ask Dr. McLauthlin and Dr. Hawkins to escort the candidate forward, and I will assure him now that he has got to make a speech. Dr. Munn was escorted to the platform amid loud applause, and addressed the society as follows:

Mr. President, and Members of the Society—I think there are few things in any man's life that he esteems more highly,

or values more highly, than an expression of the affection and regard of his colleagues in his own profession. If this election comes as a mark of esteem I shall feel highly honored by it, and it shall be my aim to endeavor to deserve that expression of confidence which you have just given me.

Colorado has always been good to me,—to me as to many others in this town who came here many years ago bankrupt in health and broken in spirit; she has taken us to her bosom, and her sunshine and atmosphere have given us new life; and the members of this society have taken us by the hand and encouraged us to again take up our work in the world, and feel that we are not dead men or fixtures in the community in which we live.

If the duties of the office to which you have elected me furnish me an opportunity to repay the debt of gratitude I owe to the state of Colorado and my colleagues, I assure you I shall not let that opportunity go by. It is my serious intent to undertake the duties with a most earnest desire to perform them so that this society may be benefited by the service rendered. and so that when the office shall pass to my successor he shall feel that the service given has not been in vain. I thank you, ladies and gentlemen, for the courtesy and the honor. (Loud and continued applause.)

The President: You will now prepare your ballots for first vice president. The list of nominations by the committee does not preclude any other nominations.

The tellers reported that there were 51 votes cast, of which Dr. Graham received 40 and Dr. Reed of Fowler, 11, for first vice president.

Dr. Graham was announced as the successful candidate for first vice president.

The President: You will now proceed to ballot for second vice president.

The tellers reported 45 votes cast, of which Dr. W. T. Little, of Cañon City, received 33; Dr. J. C. Chipman, of Stirling, 12.

The president then declared Dr. W. T. Little elected as second vice president.

The President: You will now prepare your ballots for third vice president.

The tellers reported 46 votes cast, of which Dr. Wm. Dow of La Junta, received 30, and Dr. Sard Wiest of Longmont, 13.

The President: Dr. Dow having received the majority of votes cast, is elected to the office of third vice president. You will now proceed to elect a corresponding secretary.

Dr. Kahn: I was instructed to withdraw the name of Dr. Conroy, and move that the secretary cast the vote of the society for Dr. Whitney as corresponding secretary.

Dr. Whitney: I have occupied this office for five years, and it is not a sinecure, as any one knows. I feel it would be more or less of a privilege to withdraw my name, as I had fully expected to do. I will, however, take it another year if Dr. Conroy is sure that he does not want it.

The President: The motion to instruct the secretary to cast the ballot of the society for Dr. Whitney is in order.

The motion was made and carried.

The secretary announced that she cast the ballot of the society for Dr. H. B. Whitney of Denver, who was thereupon declared to be duly elected to the office of corresponding secretary.

The President: You will proceed to ballot for recording secretary.

The name of Dr. Alicia Jeffery was also placed in nomination for recording secretary.

The tellers reported 47 votes cast, of which Dr. Minnie C. T. Love of Denver, received 33, and Dr. Alicia Jeffery received 14.

The President: Dr. Love of Denver has received the larger number of votes and is duly elected to the office of recording secretary. You will proceed to ballot for assistant recording secretary.

Dr. Hopkins: I desire to withdraw my name as a candidate, and move that the recording secretary cast the ballot of the society for Dr. W. A. Kickland. Carried.

The secretary announced that she cast the ballot of the society for Dr. W. A. Kickland of Fort Collins, who was thereupon declared to be duly elected to the office of assistant recording secretary.

On motion the secretary was instructed to cast the ballot of the society for the four candidates for committee on membership.

The secretary announced that she cast the ballot of the society for Dr. S. G. Kahn, Dr. C. K. Fleming, Dr. C. A. Powers and Dr. D. F. Dayton, as committee on membership, who were thereupon declared to be duly elected to that office.

On motion, the secretary was authorized to cast the ballot of the society for the board of trustees as nominated by the committee on nominations.

The secretary thereupon announced that she cast the vote of the society for Drs. J. T. Eskridge, A. Stedman, W. E. Wilson, S. E. Solly, E. J. A. Rogers, H. Work and J. N. Hall, who were thereupon declared to be duly elected as members of the board of trustees.

The President: We will now proceed to elect a treasurer.

The tellers reported 47 votes cast, of which Dr. W. J. Rothwell of Denver, received 29, and Dr. T. J. Gallaher of Denver, received 18.

Dr. Rothwell was thereupon declared duly elected treasurer.

The President: That finishes the list of officers as furnished by the committee. Is there any new business to come before the society?

Dr. Munn: I think Dr. Hall has a word to say.

The President, Dr. Hall: I simply want to thank the members of the society for their kindness and assistance, and the magnificent executive committee for their work in the preparation for this meeting.

Dr. Tyler: I wish to move a vote of thanks to the hotel, to the executive committee and the committee on exhibit, and to the officers of the society.

Dr. Davis: I move to amend that by placing the name of Dr. Hall at the head of the list.

Dr. Tyler: I will accept that amendment.

Carried by a rising vote.

There being no further business the society, on motion, adjourned sine die.

By-Laws.

ARTICLE I.

MEMBERS.

Any regular graduate of medicine and surgery may become a member of this society, who, by his adherence to the Code of Ethics of the American Medical Association, shows himself entitled to the confidence and fellowship of his medical brethren, and who, by his general conduct and mode of life, proves himself worthy of being a member of one of the learned and liberal professions.

ARTICLE II.

Section 1. Every candidate for membership in the Colorado State Medical Society shall make a written application to the committee on admission, and such application shall be accompanied by a diploma or certificate vouching for possession of the same from some regular medical college, the requirements of which conformed to those for membership in the American Medical Association at the time the diploma was issued, and his reputation shall be vouched for, in writing, by at least two members of the society.

Sec. 2. If this committee shall report favorably thereon to the society, the candidate shall be balloted for, and the approving vote of three-fourths of the members present shall be necessary to his admission.

ARTICLE III.

No individual who shall be under sentence of expulsion or suspension from any state or local medical society of which he may have been a member, or whose name shall have been, for non-payment of dues, dropped from the rolls of the same, shall be received as a member of this society, or be allowed any of

the privileges of a member, until he shall have been relieved from the said sentence or disability by such society, or shall have paid up all arrears of membership; nor shall any person, not a member and supporter of a local medical society, where such a one exists, be eligible to membership in the State Medical Society of Colorado.

ARTICLE IV.

Honorary membership may be conferred by a vote of two-thirds of the members present at any regular meeting of the society, upon worthy and distinguished medical gentlemen.

ARTICLE V.

INITIATION FEE.

All the members of the society (honorary excepted) shall, at the time of their admission, sign the constitution and pay an initiation fee of $5, nor shall membership be consummated until the provisions of this article are complied with.

ARTICLE VI.

ASSESSMENTS.

All members shall pay such annual assessments as may be made from time to time by the society. Said assessments to fall due at the annual meeting when made.

ARTICLE VII.

OFFICERS.

The officers of this society shall be a president, three vice presidents, designated and elected specially as first, second and third vice presidents; a corresponding secretary, a recording secretary, a treasurer and a standing committee on admission of members, all of whom shall be elected annually by ballot, and by a majority vote, at the regular meeting, to serve until their successors are duly elected and qualified.

ARTICLE VIII.

BOARD OF TRUSTEES.

The members of this society shall also, at each annual meeting, elect a board of trustees, consisting of seven members —of which board the officers-elect of this society may constitute

a part—in whom shall be vested the government of the society and the management of its business. The board shall be authorized to elect their own officers, and shall serve until their successors are duly elected and qualified.

ARTICLE IX.

COMMITTEES.

The following standing committees shall be annually appointed by the president: First, an executive committee; second, a committee on finance; third, on publication; fourth, on medical ethics; fifth, on medical societies; sixth, on necrology; seventh, on legislation; eighth, on by-laws.

ARTICLE X.

DUTIES OF OFFICERS.

It shall be the duty of the president to preside at all regular meetings of the society, enforce a due observance of the constitution and by-laws, see that all members of committees and officers perform their respective duties, appoint all committees not otherwise provided for, give the casting vote only, sign diplomas and all other official documents requiring his signature and perform such duties as pertain to his office by usage and custom.

ARTICLE XI.

The vice presidents shall assist the president in the performance of his duties, and in his absence shall preside in order of their rank.

ARTICLE XII.

Section 1. The corresponding secretary shall conduct the correspondence of the society, notify the chairmen of committees of their appointments, and request them to answer in writing whether or not they accept; give due notice of annual meetings, sign diplomas, and certify to all official acts requiring the same; receive the signature and initiation fees of all duly elected members and the annual dues of all members, transferring all moneys so received to the treasurer; have the charge of all books, manuscripts, instruments, preparations and other scientific property belonging to the society, and shall keep a catalogue of the same, and report on the condition of the same at the annual meetings.

The corresponding secretary will receive, as compensation for the faithful discharge of his duties, the sum of one hundred dollars ($100) per annum.

Sec. 2. The recording secretary shall keep correct minutes of the proceedings of the society, and make a full report of the discussions on all papers, take charge of the minute books and other documents and papers read before the society immediately at the close of each session, and keep them during the intervals, subject to the inspection of any member desirous of so doing. If necessary, in order to give a full and correct report of all proceedings and discussions, he shall, at his own expense, furnish a stenographer during the sessions of the society. The recording secretary shall receive, as compensation for the faithful discharge of his duties, the sum of fifty dollars ($50) per annum.

ARTICLE XIII.

The treasurer shall receive all moneys due to the society, and pay all bills endorsed by the finance committee and countersigned by the president, keeping correct accounts of the same and making a full and detailed report at the annual meeting.

ARTICLE XIV.

Any member who shall fail to pay his dues for a period of three years shall be dropped from the roll of membership, and so notified by the secretary.

ARTICLE XV.

DUTIES OF COMMITTEES.

Standing committees shall keep regular minutes of their proceedings, and furnish an authentic copy to the secretary, and make a written report at the annual meeting.

ARTICLE XVI.

It shall be the duty of the committee on admissions, upon receiving the names of candidates for membership, to make inquiry and report such as may be found worthy to the society, which may thereupon elect them. Should the committee fail to report upon such nominations submitted to them, any members having made such nominations may renew the same directly to the society, in which case a vote of four-fifths of the members present shall be requisite to constitute an election.

ARTICLE XVII.

The executive committee shall digest and prepare the business of each meeting, provide suitable rooms for the purpose of the society, recommend plans for the promotion of its objects, and in all things protect and look after the general interests of the society.

ARTICLE XVIII.

The committee on finance shall superintend the monetary affairs of the society, inspect and audit all bills and accounts of the treasurer, and make such an assessment, by a *pro rata* tax upon the resident members, as may be necessary for the incidental expenses, subject, however, to the approval of the society.

ARTICLE XIX.

The committee on publications shall superintend the printing of such papers, with the full discussion thereon, as may be ordered to be published, so that they may be issued on uniform paper. The publication of the Transactions shall not be permitted until final revision of proof and its adoption, with permission to print, signed by a majority of the committee on publication, and under the title "Transactions."

ARTICLE XX.

The committee on ethics shall hear all complaints of any breach of etiquette or violation of medical ethics. It shall decide all questions of ethics submitted to it. If any member shall be charged in writing by any other member of the society with any violation of the provisions of the by-laws, or with unprofessional conduct, a copy of such charge shall be furnished him; himself and his accuser cited to appear; when the committee shall proceed to hear the case, reserving its decision to be reported to the society, when its action may be affirmed by a vote of two-thirds of the members present.

ARTICLE XXI.

The committee on medical societies shall consider and report on the organization of such medical societies as desire to become auxiliary to the State Medical Society, and generally

take charge of this department, making at each annual meeting as complete a report as practicable.

ARTICLE XXII.

The committee on necrology shall report the death of any member of the society, with a brief biography, and this report shall be published in the Transactions.

ARTICLE XXIII.

The committee on legislation shall report to the society any matter concerning its welfare which requires state legislation, and see that the same is properly presented to the legislature for action, if so instructed by the society.

ARTICLE XXIV.

The committee on by-laws shall report to the society any needed change in its by-laws.

ARTICLE XXV.

DISCIPLINE.

A member may be expelled, suspended or reprimanded by a vote of two-thirds of the members present at any annual meeting, which vote shall be had in consequence of a report from the committee on ethics, and which may be confirmed by a majority of the board of trustees.

ARTICLE XXVI.

Any member wishing to withdraw from the society shall be permitted to do so on his written request, after he shall have presented the treasurer's receipt for all moneys due.

ARTICLE XXVII.

The regular meeting shall be held annually, and shall commence on the third Tuesday of June. The place of meeting shall be determined by a committee of five appointed by the society, and a banquet shall be given on the evening of the last day, as arranged for by the executive committee.

ARTICLE XXVIII.

Special meetings shall be called at any time by the board of trustees.

ARTICLE XXIX.

At a meeting the presence of nine resident members shall be necessary to constitute a quorum.

ARTICLE XXX.

The order of proceedings shall be as follows:

1. Opening of meeting by prayer.
2. Reading of minutes by the secretary.
3. Annual address by retiring president.
4. Annual reports of officers and standing committees.
5. Election of officers.
6. Annual and special committees' reports.
7. Voluntary papers, contributions, reports.
8. Annual assessment shall be laid by resolution.
9. Miscellaneous business.
10. President-elect shall assume the chair and announce committees for succeeding year.

ARTICLE XXXI.

These by-laws may be repealed, annulled, altered or amended at a regular meeting, on the recommendation of two-thirds of the members present.

LIST OF THE PRESIDENTS OF THE SOCIETY FROM ITS ORGANIZATION.

1871—*R. G. Buckingham, M. D.....Denver
1872— W. F. McClelland, M. D.....Denver
1873—*G. S. McMurtrie, M. D.....Central
1874—*H. K. Steele, M. D.....Denver
1875—*W. H. Thacker, M. D.....Denver
1875— H. O. Dodge, M. D.....Boulder
1876—*W. H. Williams, M. D.....Denver
1877— T. G. Horn, M. D.....Colorado Springs
1878— A. Stedman, M. D.....Denver
1879— B. P. Anderson, M. D.....Colorado Springs
1880— F. J. Bancroft, M. D.....Denver
1881— H. A. Lemen, M. D.....Denver
1882— P. R. Thombs, M. D.....Pueblo
1883— W. R. Whitehead, M. D.....Denver
1884— Jesse Hawes, M. D.....Greeley
1885—*J. C. Davis, M. D.....Denver
1886— J. W. Graham, M. D.....Denver
1887— S. E. Solly, M. D.....Colorado Springs
1888— S. A. Fisk, M. D.....Denver
1889— J. W. Collins, M. D.....Grand Junction
1890— J. T. Eskridge, M. D.....Denver
1891— W. M. Strickler, M. D.....Colorado Springs
1892— W. E. Wilson, M. D.....Denver
1893— E. J. A. Rogers, M. D.....Denver
1894— Hubert Work, M. D.....Pueblo
1895— I. B. Perkins, M. D.....Denver
1896— Robert Levy, M. D.....Denver
1897— L. E. Lemen, M. D.....Denver
1898— W. A. Campbell, M. D.....Colorado Springs
1899— J. N. Hall, M. D.....Denver
1900—Wm. P. Munn, M. D.....Denver

*Deceased.

A LIST OF THE READERS OF PAPERS OF THE SESSION OF 1900.

Bane, W. C.
Bennett, A. L.
Black, M.
Blaine, J. M.
Cline, J. W.
Davis, W. B.
Denison, Chas.
Eskridge, J. T.
Finney, F.
Freeman, L.
Gallagher, T. J.
Gildea, P. F.
Graham, R. F.
Grant, W. W.
Hall, J. N.
Hawes, J.
Hershey, E. P.
Hickey, C. G.
Holmes, A. M.
Jackson, E.
Kahn, S. G.
Kickland, W. A.
Lippincott, Col. H.
Levy, R.
Little, W. T.
Love, M. C. T.
Lyman, C. B.
Mann, A.
McLauthlin, H. W.
McNaught, F. H.
Miel, Geo. W.
Mills, C. K.
Mitchell, W. C.
Munn, W. P.
Nancrede, C. B.
Perkins, I. B.
Pershing, H. T.
Powers, C. A.
Reed, W. W.
Rogers, E. J. A.
Sewall, H.
Spivak, C. D.
Stevens, E. W.
Stuver, E.
Tyler, G. E.
Van Zant, C. B.
Waxham, F. E.
Whitney, H. B.

LIST OF THOSE WHO TOOK PART IN THE DISCUSSION OF THE SOCIETY'S PAPERS, SESSION OF 1900.

Bane, W. C.
Beggs, W. N.
Black, M.
Davis, W. B.
Denison, Chas.
Edson, C. E.
Finney, F.
Freeman, L.
Graham, R. F
Grant, W. W.
Hall, J. N.
Hawes, J.
Hickey, C. G.
Hill, E. C.
Jackson, E.
Mann, A.
McLauthlin, H. W.
Miel, G. W.
Mills, C. K.
Mitchell, W. C.
Munn, W. P.
Perce, —.
Perkins, I. B.
Powers, C. A.
Rogers, E. J. A.
Sewall, H.
Spivak, C. D.
Stedman, A.
Stevens, E. W.
Tyler, G. E.
Van Zant, C. B.
Whitney, H. B.

President's Address.

THE DISEASES OF THE BRONCHIAL GLANDS.

BY J. N. HALL, M. D., DENVER, COLO.

American medical literature is singularly barren upon the subject of the diseases of the bronchial glands. Vastly more attention has been bestowed upon scores of subjects of so little comparative importance that the oversight is almost inexplicable. It is with the hope of calling attention to this little-studied field, so far as our text books deal with it, that I address you.

From the great number of cases of diseases of these glands quoted by English writers I feel certain that they are much oftener and more seriously involved in English children than in those of this country. Osler, who has doubtless had as wide a clinical experience as any American physician, formerly stated, although I can not now find the reference, that he had never seen bronchial obstruction from pressure of enlarged glands, and but few cases have been reported in this country in comparison with those abroad. Nor have other symptoms of their enlargement been frequently noted.

The bronchial glands, over a score in number, are grouped about the bifurcation of the trachea, being larger and more numerous upon the right than upon the left. Some of the largest are found immediately under the arch formed by the two main bronchi. A chain of small glands extends upward along the left recurrent laryngeal nerve as it winds under the aorta, and another along the right as it passes under the subclavian artery. These glands intercommunicate freely, and receive also the lymphatics of the neck, chest and the organs therein contained, especially the trachea, the bronchi, the lungs and the pleurae.

Their relationship with the supra-clavicular glands is effected, according to Baréty, by the group of glands found behind the sterno-clavicular articulation made up by the confluence of the chain situated in front of the cervical fascia, the internal mammary glands, and the tracheo-bronchial chain; with this group the supra-clavicular glands communicate freely.

Along the branches of the bronchi extending into the lungs are smaller lymphatic glands, of less interest pathologically, but nevertheless capable of causing trouble similar to that originated by the tracheo-bronchial glands on a larger scale. They are found near the primary divisions of the bronchi, especially posteriorly, we are told by Quain, and at the bifurcations of the branches of the pulmonary artery.

All of these glands are relatively larger in the child than in the adult, and, because of the activity of the lymphatic system in the child, they are especially prone to be involved by disease.

These glands have a free vascular supply from the bronchial arteries, and receive the afferent lymphatics from the lungs, pleurae and neighboring parts. Guéneau de Mussy and Peter[1] have shown that lesions of the naso-pharynx and even facial erysipelas may react upon the bronchial glands through the intervention of the deep cervical glands.

As the bifurcation of the trachea is found opposite the fifth dorsal vertebra posteriorly, and behind the lower end of the manubrium sterni anteriorly, and as the bronchial glands lie chiefly at or above the bifurcation, it is at or above these points that we look for the chief signs of their presence when enlarged.

The glands are enlarged in conjunction with the involvement of the lymph glands of the entire body in leukemia, pseudo-leukemia, leprosy, syphilis, general tuberculosis and possibly of other diseases. Primary lymphosarcoma and lymphadenoma, the latter formerly mistaken for cancer, also occur, as well as cancer and fibroma. The largest glands are found in connection with disease of bone, especially tuberculous disease.

Simple lymphadenitis arises from any acute or chronic process inflaming organs the lymphatics of which reach the bronchial glands. As examples of these diseases we may mention acute bronchitis, pneumonia, broncho-pneumonia, pleurisy,

chronic bronchitis, the sub-acute or chronic lung changes following measles and whooping cough, typhoid fever, and diphtheria.

Marfan[1] states that the individual ganglia may reach a diameter of two or three centimeters. During the acute stage of the inflammation they are reddish or liver-colored, becoming, as the process becomes sub-acute or chronic, paler, firmer, and even sclerotic.

At the post-mortem examination we find, aside from the above changes of simple lymphadenitis, many other conditions of interest. In this region, where, from the extensive mining interests, great numbers of men are affected with miner's phthisis, the absolutely black glands described by Wilson Fox[2] are frequently seen—a real melanoma, often softened into a black, pulpy mass. The gritty feel, from the presence of particles of coal, silica or other mineral substance, is notable, these particles being arrested by the glands as by so many filters, until the limit of capacity is reached. Dust particles not arrested by the mucous corpuscles, swept thence outward by the ciliated epithelial cells and expectorated, are taken up by the swollen alveolar cells, if not too numerous. If so, they penetrate the mucous membrane, reach the lymph spaces, and even enter the lymph current to be carried to the small lymph nodules surrounding the bronchi and the blood vessels; to the interlobular septa beneath the pleura; or along the lymph channels to the bronchial glands, in the cells of which they lodge (Arnold). Weigert[26] has shown that when densely pigmented glands adhere to the pulmonary veins some of the carbon particles may pass into the general circulation to be arrested in the liver and spleen, although in all but extreme cases the bronchial glands are a sufficient defense to the system.

The particles deposited in the follicular cords of the tracheal and bronchial glands and the smaller lymph nodules finally excite proliferation of the connective tissue elements (Osler), the glands becoming sclerotic as above described. M. Carrien (quoted by Charcot) lays stress upon the impermeability of the hypertrophied glands as a condition precedent to pulmonic anthracosis. Marfan[1] ascribes the development of emphysema in pneumonoconiosis to the damage to the lymph channels and con-

sequently to the alveolar epithelial cells, atrophy of the alveolar walls resulting.

It is, however, in tuberculosis that we find the most important changes in the bronchial glands. They are greatly enlarged and often show tuberculous granulations, although we may find, as Fox has mentioned, a true "lymphadenitis tuberculosa, in which, from the swelling and diffuse infiltration, no granulations may be discernible." Cheesy degeneration is often found, but it is not a necessary part of the transformation, for the swollen gland and probably the tuberculous granulations may have fibroid metamorphosis, thickening of the reticulum and septa, and the whole tract of glands becomes a glistening, semi-cartilaginous substance with scattered nuclei through it. The glands are likely to be deeply pigmented, especially those nearest the lung; are hard and resistant upon section; and, by a continuation of the process outlined, may shrink to less than the normal size. They adhere, not only to each other, but to the connective tissue of the mediastinum and the edges of the lung. In other cases, we have all gradations "from the grayish granulations sown in a congested parenchyma to the uniformly yellowish and caseous gland, sometimes with a thick fibrous capsule, sometimes a real cyst of pus, sometimes more dry and cheesy;" while a true cure results in those cases where lime salts have been deposited in abundance. The tuberculous bronchial glands may be found deep in the lung. Cruveilhier states that the glands at the bifurcation of the trachea enlarge most in tuberculosis, although the others may attain a very large size.

In a recent case at the Arapahoe County hospital, in which the characteristic cough and other signs existed during life, so that I had entered the diagnosis as "pulmonary tuberculosis with enlarged bronchial glands," a single gland near the bifurcation of the trachea was an inch in diameter and entirely caseous. Many others were found enlarged, but less matted together than one would have expected. Extensive and advanced tuberculous lesions were found in both lungs. We should note, however, that Ziegler lays especial stress on the frequent presence of such large glands in cases with but a small focus of disease in the lung. E. Smith states that if the glands remain large in any case they are presumably tuberculous.

It has long been recognized that the bacillus of tubercle is found in the bronchial glands of children and adults, and may be demonstrated by inoculation experiments if not microscopically. Thus, H. P. Loomis[3] found that the bronchial glands were infective to rabbits in eight out of thirty cases in which no signs of tuberculosis were found. Pizzini[4] injected, with aseptic precautions and control animals, the bronchial glands of forty patients dying suddenly, all adults but one and not appearing tuberculous, into animals, and, throwing out ten in which mixed infection occurred, found that forty-two per cent. of these animals developed tuberculosis. Of those injected with the cervical glands from the same subjects, but two per cent. became tuberculous, and none of those upon whom the mesenteric glands were used.

In children the bronchial glands are tuberculous in most cases coming to autopsy. Northrup's record of 125 autopsies in which these glands in every one were tuberculous has often been quoted. In fact, this is by no means a new discovery, for Steiner, in 1865,[5] found the bronchial glands microscopically tuberculous in 275 of 302 children. Spengler[6] concludes that the bronchial glands are the most frequent seat of primary tuberculosis, and the tendency amongst pathologists is to agree with him. Thus Weigert[7] states that infantile tuberculosis is not primary in the lungs as commonly as in the adult, but secondary from the bronchial and pulmonary glands. He quotes many authorities who agree with this view.

The influence of these glands in the origination of other tuberculous processes than those of the respiratory tract has been underestimated in the past. Bertalot[8] found tuberculous bronchial glands in twenty out of twenty-four children dead of tuberculous meningitis; while but one showed primary tuberculosis in the mesenteric glands. Reimer[9] in forty-two cases of the meningeal infection found caseous bronchial glands thirty-six times and miliary tuberculosis of these glands five times, but one being free from involvement.

Henoch[10] reported seventeen cases of tuberculosis of these glands in eighteen of meningitis, in three the mesenteric glands being affected.

Further quotations would be superfluous. The wonder is that, with the almost constant involvement of these glands, tuberculous meningitis is so comparatively rare.

Lesage and Pascal[11] explain the origin of tuberculous meningitis through communication of the lymph vessels of the neck with the perivascular lymph spaces of the brain membranes. The cervical glands are infected intermediately. It is probable, they state, that infection may occur by way of the spinal canal.

Weigert[12] believes that the disease remains local in the bronchial glands owing to closure of the lymph vessels leading from them. A lack of tendency to soften is favorable, for tuberculosis is often spread by the breaking down of the glands which results from a mixed infection.

Induration of the glands from the presence of mineral dust, with the development of fibroid contraction and consequent smaller blood supply and lack of oxygen, is to be considered a conservative process as regards tuberculosis elsewhere.

General miliary tuberculosis probably originates more frequently from the bronchial glands than from any other source. Communication of a disintegrating gland with the blood current by ulceration into a vein is probably certain to cause a general infection.

Guthrie[13] believes that the thoracic glands are the place of origin of many cases of tuberculous meningitis, and that these glands may become tuberculous not only through inhalation of bacilli, but by the entrance of the latter through the lymphatics of the pharynx, tonsils and esophagus, intestines, and abdominal glands, and even from the thoracic duct by way of the pulmonary circulation. We should particularly insist upon the predominating influence of the tracheo-bronchial glands as compared with any other lymph glands in the origination of tuberculous processes elsewhere in the body.

The lung may be involved by way of the lymphatics, a lymphangitis, connecting the distant focus in the lung with the glands, setting up the process.

As evidence that the lymph glands in the child are often primary sources of pulmonary tuberculosis we have the statement by Voelcker that the disease often involves both lungs and spreads outward from the hilus, contrary to the usual rule in the

adult.[14] I believe it is quite probable, in some cases in adults in which we recognize tuberculosis in the apex of the lower lobe of the lung after that at the true apex, that it comes from a local infection from caseous, ulcerating glands.

Practically all phthisical patients have tuberculous bronchial glands, while the bronchial phthisis of the older writers, a tuberculosis of the glandular apparatus rather than the lung, is much more frequent in children than in adults. It has been suggested that they inhale the bacilli during babyhood from unusual exposure in crawling upon the floor, but extreme susceptibility seems to me to be the most important factor in the infection of these glands in childhood, for all residents in civilized communities inhale the omnipresent micro-organism.

Parrot formulated the statement that tuberculosis of a group of glands always followed tuberculosis of the tributary viscera. This so-called law is now known to be incorrect, for the bacillus may penetrate the bronchial mucous membrane or other membranes and reach the lymph glands without affecting the lung or other organ at the point of entrance. Thus we have undoubtedly in the past failed to realize the vast importance of the bronchial glands in filtering out from the lymph stream the individual bacilli, and holding them prisoners in a place of comparative security. The organism is for a long time protected. It is only when enormous numbers of bacilli invade the respiratory tract that the glands are overpowered. Then, in the performance of their function, they sacrifice their own integrity, offering themselves as a forlorn hope in the attempt to prevent the general infection which is imminent.

Manfredi[15] shows that the lymph ganglia not only hold but tend to render innocuous the tubercle bacillus and many other micro-organisms as well. Schleich[56] presents the most convincing evidence of the great value of this process. Marfan and Nanu[59] have found in the glands, even of the new born, Friedländer's bacillus, Fränkel's pneumococcus, and the streptococcus. None of these infections, however, compare in frequency or importance with that by the bacillus tuberculosis. Other bacilli of less serious import are also found, notably the staphylococcus.

The enlarged glands frequently undergo the caseous metamorphosis, and remain innocuous. Calcareous matter may be

expectorated as a result of the disintegration of such a gland, or a true lung stone be expectorated.

Charles West found but six out of seventy-two cases of enlarged bronchial glands in children in which the cretaceous deposit had occurred, but the proportion is greater in adults.

Hoffman[16] states that in favorable cases the sloughing gland may be coughed up, but neither he nor any other author, to my knowledge, has quoted a specific instance of such an occurrence until the publication of my own probable case.[17] I have there given references to fifteen cases, in fourteen proven by autopsy,[18] "in which obstruction occurred in the air passages from a sloughing bronchial gland too large to be expectorated." "In the remaining case, some partially disintegrated fragments of the gland were removed by means of a catheter through the tracheotomy wound, when it was found that the operation had afforded no relief, and a still larger piece was ejected afterward. The child recovered. (Petersen's case.)"

After noting the scant mention of the diseases of the bronchial glands in the text books, and the slight attention given to them in works upon physical examination, it is a great surprise to find how the literature teems with post-mortem records of the finding of the glands in the air passages, or the cavities, especially near the root of the lung, left by their disintegration. Poland[19], Parker[20], Nachod[21], Bayeux and Andion[22], Poupon[23], Eichhorst[24], Ogle[25], Voelcker[25], and a score of others have noted many such cases. So frequently have they been found that one should always bear in mind the accidents from the diseases of these glands in the consideration of possible causes of sudden death, especially in children. Thus Parker[20] reports a case of sudden dyspnoea, resulting fatally in a previously healthy child, from rupture of a gland into the trachea just above its bifurcation, and Gulliver, Goodheart and others have seen similar ones. The reported cases of sudden death from similarly diseased glands in children previously ill are too numerous to mention.

As we shall see, the acute process, either of simple or tuberculous origin, not infrequently ends in suppuration. The gland, as the inflammation proceeds, adheres to the bronchus, the trachea, the esophagus, the pericardium, the pleura, the pulmonary veins, the pulmonary artery, or even the aorta, and

finally ulcerates through the intervening wall. We then find, as secondary processes, pericarditis, pleurisy, pneumothorax, infection of adjacent lung, hemorrhage, establishment of a cavity, caused either by the sloughing out of the glandular mass or necrosis of adjoining infected lung, or both, pulmonary abscess, or pulmonary gangrene. The cavities from sloughing glands, according to Rilliet and Barthez[36], have no bands crossing them, as do those in lung parenchyma, for in the latter case the resistant vessels remain until the last. The interior wall is smoother also. In such a cavity Cruveilhier even found a lumbricoid worm, after perforation of the esophagus.

Pericarditis and pleurisy may occur from contiguity, without perforation. The pericarditis may be typically tubercular, a large, caseous mass, or a thin membrane with sparsely scattered tubercles.[27] (Baréty.)

The hemorrhage may be immediately fatal, as in case the pulmonary artery or the aorta be opened, or less severe in case the smaller branches be affected. Many hemoptyses are of this latter origin, being often sharp and repeated in character. If the rupture occur into the esophagus, much pus may be immediately evacuated with recovery, as in the Denver case reported by Dr. H. B. Whitney[28] or the Chicago one by Dr. F. E. Waxham.[57]

If the bronchial tract or the pulmonary parenchyma be invaded, an intense capillary bronchitis is often set up, resulting in many cases in abscess or gangrene, as indicated above. It has been suggested that these processes may arise from compression of the vagi, representing the termination of a vagus pneumonia, although many of them are from direct pulmonary damage.

The secondary enlargement of the bronchial glands from malignant intra-thoracic disease we need mention but briefly, since the original disease rules in diagnosis, prognosis and treatment. Powell[29] has seen the left bronchus narrowed by compression in carcinoma of the glands, the head of the pancreas being involved probably primarily. Bennett has seen abscess of the lung, with similar obstruction of the left bronchus, from cancer. It is noteworthy that the glands are not always involved in cancer of the lung, and may remain free in cancer of the esophagus even where perforation of the bronchus or of the trachea had

occurred.[30] Tumors of the mediastinum are said by Hoffman[16] to cause enlargement of these glands but rarely, contrary to our expectations.

Since the involvement of the bronchial glands in lymphoma and lymphadenoma is but a minor part of a general disease, we shall not study these conditions at length, for it would lead us beyond the boundaries of our subject.

In gangrene of the lung, Schroeder[31] saw the bronchial glands gangrenous, and the lymphatics leading to them filled with gangrenous matter. Cruveilhier[32] and Lebert[33] have reported cases in which gangrene of the bronchial glands apparently preceded that of the lungs.

The especial interest of the glands in question lies as much in their situation as in their importance in the economy. J. L. Smith,[34] for instance, states that the bronchial and mesenteric glands are the only ones in the body which materially increase the danger of tuberculosis, or give rise to special symptoms, these symptoms being mechanical or due to rupture. Meigs and Pepper[35] call attention to the fact that the bronchial glands cause trouble from the immovable organs and unyielding walls about them, while the mesenteric glands, situated amongst freely movable organs in a cavity which easily accommodates its walls to its contents, are comparatively innocuous.

Aside from the infections of other organs, chiefly occurring in tuberculosis of the bronchial glands, these ganglia, as Rilliet and Barthez long ago pointed out, cause most damage by compressed neighboring organs, or by adhesion to them with consecutive perforation. The arteries, being movable and resistant, often escape harm. The aorta may be pushed upwards. Baréty believes that even a simple lymphadenitis predisposes to tuberculosis of the lung by compressing the pulmonary artery and thus lessening the blood supply. It is well known that phthisis is frequent in narrowing of the pulmonary artery from any cause. A suggestive fact is found in the greater liability of the branch to the upper lobe to pressure from this source, for here pulmonary tuberculosis ordinarily begins.

The enlargement of the bronchial glands, from whatever cause, leads to pressure upon contiguous organs, and we shall profit by a review of the mechanical disturbances so produced.

The upper mediastinal space, in which the glands lie, may be divided into the anterior or vascular plane, and the posterior, or tracheo-esophageal plane. The former contains the vena cava superior and brachio-cephalic veins, the aorta and its branches, the pulmonary arterial system, and the pulmonary veins, the latter the trachea, bronchi, esophagus, the pneumogastric and recurrent laryngeal nerves, and branches of the sympathetic system.

The symptoms of compression relate to the organs affected, and therefore those tumors, glandular or otherwise, in the anterior plane, as Rendu[1] has pointed out, are generally of slow evolution, venous pressure being the most prominent symptom. Bulging of the sternum and contiguous chest wall, and corresponding dulness, are to be found frequently. The disease in this region is more likely to be malignant, frequently affecting the thymus gland, while the posterior plane is more often involved by lymphatic growths.

In this posterior plane, then, and usually from glandular enlargement, we are likely to find evidences of mechanical interference with respiration from compression of the trachea or bronchi; hoarseness or aphonia from pressure upon the recurrent laryngeal nerves; dilated pupil from irritation of the sympathetic, or contracted pupil from its paralysis; dysphagia from compression of the esophagus or of the filaments of pneumogastric origin supplying its upper portion; vomiting of similar origin; or tachycardia, either constant or intermittent, from abolition of vagus influence from pressure.

Compression of the phrenic nerve gives rise to diaphragmatic neuralgia, to hiccough, and to a definite phrenic dyspnoea, we are told by Marfan. It should be remarked here that certain of these, as of following symptoms, are rare, and have not come under my personal observation. Unilateral salivation has been noted from sympathetic paralysis. The weakened pulse of inspiration, reminding one of the *pulsus parodoxus*, in which, however, the pulse is slowed but not weakened, is accounted for by pressure upon the great vessels. It is at times unilateral, at times found in both arms. A systolic murmur may originate from pressure upon the base of the pulmonic artery, or the aorta.

Tschamer[16] has seen the fingers clubbed, a result of interference with the venous return, as in other chronic chest diseases. Hoffman lays much stress upon venous stasis as the result of pressure, showing itself in the whole upper portion of the system. If the vena cava superior be involved, the stasis occurs in the facial veins and over the shoulders and arms, sometimes unilaterally. The anterior surface of the thorax becomes covered by a network of veins, if the compression be complete, and the blood enters the vena cava inferior by anastomosis of the greater and lesser azygos veins, and the intercostal, internal mammary, epigastric, abdominal, subcutaneous and circumflex iliac veins. (Marfan.) If the collateral circulation fails, edema of the hands and face occurs, with cyanotic lips, injected eyes, epistaxis, vertigo, headache, and, if we are to credit Rilliet and Barthez[36], meningeal hemorrhage.

If the pulmonary veins be compressed, edema of the lungs, hydrothorax, and occasionally hemoptysis may be found. Hydrothorax may be unilateral, Marfan states, that limited to the right being found where the vena azygos major alone is compressed.

Ruhle[37] believes that dilatation of the left ventricle may occur from pressure of enlarged glands upon the aorta.

Cruveilhier (quoted by Fox) states that suffocation in infants probably occurs occasionally from pressure upon the laryngeal and vagus nerves. If thick mucus closed a glottis already in a state of spasm in a weak child, this would be readily explicable.

Since venous obstruction, the most prominent symptom of tumor in the anterior mediastinum, is borne with much less difficulty than the symptoms noted above as found in the glandular enlargements of the posterior plane, the latter are more immediately dangerous, suffocative accidents being especially to be feared. Although with any considerable increase in the size of these glands many organs are pressed upon, the brunt of the trouble is usually felt by certain structures more than by others. By inflammation the glands become adherent to contiguous organs, and may, indeed, show the most varying symptoms of pressure as the different structures are more or less involved.

Of the utmost importance is the pressure exerted upon the trachea and the larger bronchi. From the position of the larger glands these tubes rarely escape, the right main bronchus being most frequently involved.

With increasing pressure the entrance of air is more and more interfered with. If the lower end of the trachea be affected, the respiratory murmur upon both sides of the chest is enfeebled, while but one side, most often the right, is so affected if a main bronchus is compressed. The French have described particularly[38] the tracheo-bronchial *cornage*, caused by the passage of the inspired air through the narrow tube, a sign of the first importance and most noticeable in my own recent case of obstruction. With this is commonly associated *tirage*, or inspiratory retraction of the thorax, as a whole if the trachea be obstructed, otherwise limited to the side of the affected bronchus; due, of course, to the difficulty of filling the air vesicles because of the obstruction.

If we add to these two signs the enfeebled vesicular murmur with conservation of the vesicular resonance, bilateral in case of tracheal obstruction, otherwise unilateral, we have sufficient evidence upon which to base a diagnosis of respiratory obstruction. If the signs be bilateral, we must exclude edema of the glottis, spasm of the glottis, polyp and membranous exudate, for tracheotomy has been uselessly done for compression of the trachea by simple lymphadenitis, as for aneurism. In all of the last mentioned diseases, however, the voice is affected, while the larynx remains immobile and the voice comparatively clear, despite the most violent dyspnoea, if the obstruction be below it—the latter sign being strikingly prominent in a case I have recently seen with Dr. Love, of Denver.

From the compression of the air passages the number of respirations is decreased, inspiration and more especially expiration being prolonged, we are told by Grancher[58].

Marey long ago observed the increased frequency of the pulse in such respiratory difficulty, contrasting markedly with the slow respiration. Slowing of the pulse from pneumogastric irritation must not be forgotten.

The expansion of the affected side is notably diminished, so that finally a unilateral thoracic retraction may be noted, as after pleurisy.

Guéneau de Mussy[39] even believes that the scoliosis, with retracted chest and lowered shoulder in children, is commonly from this cause.

Lagging of the affected lung is noticeable[40]. The indrawing of the affected side is greatest below because of the fact that the air reaches this part of the chest last, while the diaphragm pulls in the attached ribs in its contractions.

Long continued obstruction frequently produces a shortened antero-posterior diameter of the chest.

Oftentimes the patient lies upon the side of the enlarged glands, as upon the side of a pleural effusion, obviously that he may use the better lung. Quain mentions a boy, who recovered, whose favorite position was on his face and knees.

Patients with obstruction of the trachea or a main bronchus eventually perish[1] by (1) slow suffocation, (2) pulmonary edema, (3) broncho-pneumonia, (4) pneumonia, (5) gangrene, (6) abscess of lung, or (7) by immediate suffocation from collapse of the weakened cartilages of the tube at the point of compression. To these causes we should obviously add (8) sudden suffocation from lodgment of a sloughing gland in the air passages, and (9) obstruction of a much narrowed canal by tough mucus.

We should here speak of the sudden exacerbation of symptoms, relating either to air passages or to other structures, from sudden fluxion to the periganglionic tissues and consequent increase of pressure. Such fluxion, coming from exposure to cold or other irritation of the respiratory tract, may cause very serious symptoms in a few hours, in the more advanced cases, especially if obstruction from thick mucous secretion be superadded.

From the position of the esophagus we may readily see that dysphagia must result in some of the cases we are studying. I have seen it in at least two cases. Spasm of the tube is also found at times, as mentioned by Hoffmann. The obstruction may not be apparent upon passing the sound, and is thus at times thought to be hysterical. Hoffmann believes that it may be due to pressure on the branches of the vagus supplying the esophagus as well as to direct pressure upon the tube. It may diminish or disappear upon the bursting of an abscess of the glands. Marfan[1] mentions that direct pressure gives rise to constant difficulty of swallowing, while painful esophagismus and pharyng-

ismus arise from pressure upon the nerve fibres above mentioned supplying the upper esóphagus and the pharynx, as in the case of other mediastinal tumors. It is stated by Quain[41] that dysphagia was present in ten of fifty-eight cases, in one case especially for liquids.

The laryngeal and tracheal symptoms caused by pressure from the diseased glands are of the greatest interest. Marfan states that at times the larynx does not move upon swallowing and during respiration, because of fixation of the trachea in the mass of glands, evidently.

The trachea may be pushed forward or displaced laterally, but the signs pertain to cases of mediastinal tumor of other than glandular nature as a rule.

The paroxysmal cough, so strikingly like whooping cough, is the most prominent symptom in many cases. It is stated by Hoffmann[16] that the pressure of the glands near the tracheal bifurcation causes the specially severe cough seen in certain cases, because of the presence of the recurrent laryngeal nerves in this situation where they are subjected to pressure, to traction, or to hyperaemia from contiguity to the inflamed glands. The expectoration is often mucous, as in bronchial catarrh, and may contain pus if glands be breaking down, often mixed with air. Calcareous particles from the disintegrating glands may be expectorated. Many patients raise absolutely nothing. (Quain.)

The cough differs from that of pertussis in its non-contagious character, in the fact that there is no inspiratory whoop, and in the longer duration, not subsiding in a few weeks as in the contagious disease. Notable cough was present in thirty-nine out of fifty-eight cases, in twenty-one of them being the most troublesome symptom. (Quain.)

Hoarseness or aphonia may result from involvement of the recurrent nerves, especially of the left which passes deeper into the mediastinum than the right and is therefore more subject to pressure.

Eustace Smith[48] states that many supposed cases of asthma in children are paroxysmal attacks of dyspnoea from the irritation of enlarged bronchial glands. Day[42] believed that laryngismus stridulus was due to the same cause. He also mentions that the spasmodic cough, lividity and threatened asphysia may simulate asthma closely and may end fatally.

Much interesting work has been done in studying the effect of compression of the recurrent laryngeal and other nerves upon the larynx. Paralysis of all the muscles of the glottis leaves it open, as in the cadaver (Krishaber[43]). Paralysis of one cord can not produce dyspnoea. The only paralysis producing closure of the glottis is that of the abductors, the crico-arytenoidei postici, allowing the opponents to act unopposed. But double paralysis of this nature is rare, and none of the cases quoted by Ziemssen or Riegel were caused by tumors. Johnson reports one such case (quoted by Fox).

Further, the recurrent nerves supply nearly all the muscles of the larynx, and paralysis of any single muscle or pair of muscles could hardly occur from compression of the whole nerve. Stimulation of the recurrent may give dyspnoea but does not always do so, while aphonia is the most constant symptom of paralysis.

Krishaber states that dyspnoea, in these cases, if the voice be preserved, demands tracheotomy (or, in these days, intubation), since the preservation of the voice indicates that the trouble is spasmodic, the nerves therefore being still intact. Dyspnoea with loss of voice is not benefited by the measures indicated, for such dyspnoea, not being due to paralysis alone, must be due to pressure upon the trachea below, not capable of relief by these measures; hence they are useless. As paralysis may co-exist with spasm, however, these indications are less valuable than they otherwise would be. The most urgent dyspnoea may arise in paralysis of the larynx from sudden stopping of the glottis by accumulated mucus. Compression of the trachea probably explains most cases of severe dyspnoea from enlarged bronchial glands, either by intermitting degrees of pressure, or by superadded accumulation of mucus.

Fox states that paroxysmal dyspnoea without compression of the trachea or aphonia has been proven post mortem to be due to a thrombosis of the pulmonary artery, although simulating the former conditions.

Of Quain's fifty-eight cases, thirteen had dyspnoea, in four of these cases resembling spasmodic asthma and occurring especially at night.

Quain found pain at the fourth or fifth dorsal vertebra on one or both sides in twenty-two out of fifty-eight cases. It oc-

casionally existed under the manubrium. Tenderness may coexist with pain in either locality.

We have seen that vomiting occurs from irritation of the pneumogastric nerve in certain cases. It is probable that this symptom in phthisis occasionally arises in like manner, from the pressure of tuberculous glands.

The theory of de Mussy[39] that whooping cough is simply a manifestation of pressure by enlarged bronchial glands has not been established. He went so far as to suggest that this disease was an exanthem of the bronchial mucous membrane, causing great enlargement of the glands which pressed upon the recurrent nerves and thus gave rise to the crowing cough and vomiting. Neither has the theory that spasmodic croup depends upon pressure from the diseased glands obtained credence.

J. L. Smith[34] states that enlarged bronchial glands may so interfere with the return circulation from the brain as to cause the child to present most of the symptoms of tuberculous meningitis, serum being probably effused into the cerebral cavities. In one of his cases he states, however, there was no sighing respiration nor vomiting, nor was the temperature that of meningitis, so that he was not deceived.

The extreme wasting spoken of in Hare's monograph as due to pressure of mediastinal tumor upon the thoracic duct I have not found mentioned in the literature of the bronchial glands.[45]

Barry[44] saw a fatal result in a woman of 71 years, emphysematous but not tuberculous, from hemorrhage from the vena cava superior into which a gland had ulcerated. Thus neither age nor absence of the miscroscopical signs of tubercle give any assurance of freedom from this form of death. In Griffith's case,[46] hemorrhages around the tracheal glands amounting in all to less than three ounces caused death with symptoms of internal hemorrhage.

In Rautenberg's case[47] the bloody stools were found to come from perforation of a gland into the vena cava and esophagus.

It is not alone the pressure of the enlarged glands that causes symptoms of compression in certain organs, for the latter may proceed from the contraction of the gland or the cavity left by it after an acute inflammation. Traction diverticula in the esophagus may arise in this manner. The radiating scars found

occasionally in the esophageal wall commonly originate from these processes. We are told by Eichhorst[24] that contractions in calibre in the trachea or bronchi may originate in similar manner, leaving a puckered, radiated, pigmented scar. In a case reported by Eichhorst and Seydel[24] the patient died with increasing dyspnoea, and many such scars were found in the smaller bronchi, where minute glands had ruptured and eventually caused contraction.

Voelcker[14] describes a case of surgical emphysema extending from the eyes to the navel in a child in whom an ulcerated bronchial gland opened into the air passages. With the occurrence of this symptom there was a profuse expectoration of blood and pus, with the disappearance of severe dyspnoea. This author states that offensive breath in a child is often from an ulcerating bronchial gland. This suspicion would be corroborated by the finding of dulness and especially by hemoptysis.

Extensive mediastinal abscesses may arise from perforation of an ulcerating gland, and may open spontaneously through the chest wall[48] or be evacuated surgically. Cless[49] saw the chest wall perforated spontaneously. Fuller saw death from pyemia from rupture of a suppurating gland into the posterior mediastinum.

Many curious instances of perforation of several organs are on record—as Letulle's, in which the esophagus and pleura were opened by a suppurating gland and food was found in the purulent pleural contents.[50]

Numerous cases of recovery after vomiting of pus have been recorded, several being quoted by Hare. I believe the latter author hardly gives due weight to the glandular diseases we are studying as factors in the origination of mediastinal abscess.

The greatest discrepancy exists among different writers and teachers as to the possibility of detecting enlarged bronchial glands clinically. Some would lead one to infer that they may be found as easily as the cardiac dulness, while Ashby and Wright and others doubt if tuberculous glands can be detected, but think that sarcomatous ones may be. Henoch, than whom no greater authority could be quoted, doubts the possibility of the diagnosis. Many such contradictory opinions might be brought forward. The truth seems to me to be beyond question

that large glands may be detected, for many observers have made the diagnosis and confirmed it; it is likely, however, that not one case in a score reaches the degree of enlargement at which diagnosis is possible.

Gueneau de Mussy[39] states that percussion of the spine to the fourth dorsal vertebra, where the trachea ends, gives rise to a tubular resonance, but, if the bronchial glands are enlarged, to dulness. Below the fifth dorsal vertebra he states that vesicular resonance is normal. I certainly do not believe it possible for one examiner in a score to detect these changes in resonance, and, considering the thickness of the solid tissues and the smallness of the trachea in the child, in whom so much of this work must be done, I think that *a priori* we have no good reason for expecting to obtain any good results here. I have certainly not obtained any.

There seems to be a fair consensus of opinion in favor of the proposition that dullness may be found in the interscapular region when considerable enlargement of the glands exist, although Henoch and Ashby and Wright deny it, as mentioned above.

Quain[41] found dulness in one or both sides near the fourth and fifth dorsal vertebrae forty-seven times in fifty-eight cases, and under the manubrium sterni in eight cases. The latter result was obtained by examining after deep expiration with the head held backward.

F. C. Wilson[51] claims that dulness is normal opposite the root of the lungs, at the second and third dorsal vertebrae, which dulness is increased according to the amount of disease in the glands. Gueneau de Mussy[39] states that the dulness is found about the last cervical and first three dorsal vertebrae. Hoffmann rather doubts the diagnosis by percussion, front or back, but states that Arnoux[52] finds dulness from the second to the sixth dorsal vertebrae. He mentions that by palpatory percussion one may feel the increased resistance. This may easily be the case if the glands are large enough to give rise to considerable dulness. As a matter of fact, much more depends upon the size of the mass of diseased glands than upon all other factors, in their detection by percussion.

In front they are more easily found. Authorities are in much better consonance here. The manubrium sterni and the adjoining clavicular articulations, particularly upon the right,[52] cover the usually dull area. Still, in young children the normal dulness of the thymus gland, and the fact that the lungs cover any but the largest lymph glands, must be taken into account. Further, the difference between the normal apical resonance of the two lungs, and the difficulty of determining slight degrees of dulness in the upper sternal region must prevent any but fairly marked dulness from being determined.

The cracked pot sound in the upper chest of children has lost its former significance in the diagnosis of diseases of the bronchial glands, Eustace Smith stating that, on account of the pliancy of the chest wall in the child, the sound is not necessarily indicative of disease.[34]

Much divergence is found in the statements as to auscultatory sounds. Voelcker[14] believes that alterations in the breath sounds are more important than those of percussion, especially if they be unilateral. F. C. Wilson[51] finds coarse moist rales with increased vocal resonance and fremitus in most cases, and bronchial respiration heard further out from the root of the lung the more the glands are diseased. Rilliet and Barthez[36] mention that the solid mass of glands conducts the tubular sound to the surface, even though the lungs be not infiltrated nor broken down. Ashby and Wright[53] state that auscultation is still more worthless than percussion unless the glands be very large. These writers speak of the value of weakened respiratory sounds upon one side, though this sign is often masked by tuberculous disease of the lung. Marfan[1] mentions the presence of tubular respiration upon the side of the enlarged glands when they surround a bronchus, heard between the spine and the angle of the scapula. It was present in fourteen of Quain's cases.

This writer speaks of an "interscapulo-vertebral souffle," simulating cavernous or amphoric respiration, and lays much stress upon it. Hoffmann speaks of the exaggerated respiration between the scapulæ, with whistling rales, often with striking difference between the two sides. Widerhofer emphasizes the importance of any great increase in the normal difference between the two sides. Williams[54] mentions that tubular respira-

tion above the scapula in children is often due to enlarged glands, and disappears frequently under treatment.

Quain found diminished respiratory murmur in fourteen of his cases, sometimes over a whole lung and sometimes less extensive.

Of cornage and tirage we have already spoken sufficiently.

Eustace Smith[55] has stated that swollen bronchial glands may be detected by bending the child's head backward, thus tilting the bifurcation of the trachea forward, when the bronchial glands, if enlarged, so compress the left innominate vein against the sternum as to give rise to a venous murmur which disappears as the head is brought forward again. The thymus gland, lying in front of the vein, cannot bring about such a result. The murmur, however, may be heard in the normal posture and with any tumor of the lower neck. It is not produced by flat chest in the absence of glandular enlargement. If old adhesions prevent movement of the trachea, the sign cannot be produced by bending the head backward.

It is evident that no very definite diagnosis can be based upon signs and symptoms so indefinite as these we have recorded. The whole matter is in an evolutionary state, and careful work will in a few years give us much better light upon it.

The cases in which the diagnosis is possible are probably generally overlooked because of our general neglect of the subject rather than from any other cause. As instances of the value of closer study of the glands in obscure cases I shall quote briefly the following:

Dr. J. T. Eskridge has kindly given me brief notes of three cases in which pressure neuritis existed, twice in the right arm, once in the left, from involvement of the branches of the brachial plexus by pressure of enlarged lymph-glands. Although the bronchial glands could hardly produce such a result, those mentioned above as communicating with and often secondarily infecting them might easily do so, and, in fact, did in these cases so far as Dr. Eskridge could determine, for all recovered. I quote his closing sentence, for it is full of suggestive thoughts bearing upon our subject:

"This patient has remained well for a period of about six months. The second case has been well for a similar period,

while the first remained free from all pain for a period of eighteen months, but I understand that his trouble is returning. The first and third cases were evidently due to syphilis; the second, in all probability, to rheumatism. In none of these cases was there any tenderness to pressure on the nerves, external to the thorax, but the pain radiated down the nerves, as we find to be the case in pressure neuritis."

The very striking result in Eskridge's second case from the use of anti-rheumatic remedies convinces me that his theory of their action is correct—namely, that they modify a rheumatic inflammation of the fibrous tissue of the capsule of the gland.

Whatever the explanation, these three cases call our attention sharply to the need of considering syphilis and rheumatism affecting the thoracic glands in cases not otherwise explicable.

I shall merely direct attention to my own recently reported case[17], in which obstruction of the left primary bronchus, with all the classical signs, was followed by broncho-pneumonia of the lung below; expectoration of more than a pint of pus daily, obviously secreted as expectorated, for no signs of an accumulation of pus existed; this ceasing abruptly upon the expectoration of a fleshy mass, undoubtedly a sloughing bronchial gland, with complete recovery in a few weeks. The obstruction of the bronchus in the early stages, and the staphylococcic infection of the lung in the later, were evidently due to the swelling of the gland and its final disintegration by a suppurative process.

TREATMENT—The diagnosis of the diseases we are studying, though often obscure, is sufficiently clear, by inference at least, to direct us as to the treatment. In tuberculous and broncho-pneumonic enlargements, and those following measles and whooping cough, cod liver oil is the remedy above all to which we must turn, with the hope of influencing these glands as we do those of the neck in scrofulous enlargements. The syrup of iodide of iron should be given if anemia exists. The general tonic and roborant measures indicated in early tuberculosis are of the utmost value here. Such treatment should be long continued, for the danger of the development of tuberculous meningitis has been shown to be a grave one. Until the child has fully regained his health and the weight normal for his age, he should

be carefully watched, that nothing avoidable may be allowed to interfere with his general health.

Simon and many English physicians insist that counter irritation with iodine is of great value, while arsenic is given internally for its resolvent effect. Creosote is stated by Voelcker to be of great value. Spengler[6] believes in the use of tuberculin in cases of tuberculosis of the glands if there be no mixed infection. This has not yet met with general approval.

For the syphilitic cases the usual iodide treatment should be vigorously pushed.

For the enlargements secondary to malignant growths we can do nothing, and adenitis found as a part of the various blood diseases calls for no measures beyond those otherwise indicated.

In case suppuration takes place, and the pus lies near the surface of the chest, it may be possible to evacuate it by aspiration or incision, although cases are very few in which such a line has been followed. I saw Whitney aspirate in his case unsuccessfully, the glands probably being still too firm to yield fluid although subsequently the pus was evacuated freely through rupture into the esophagus—a brilliant diagnosis and a happy result. In a case of my own, seen also by Drs. Elsner, Parkhill and Bagot, in which the diagnosis yet lies between sarcoma and tuberculosis probably originating in the mediastinal glands, four exploratory punctures yielded nothing. Some three months subsequently, after the case had passed from my observation, the swelling at the second left interspace ruptured and discharged pus, so that I now incline to the diagnosis of tuberculous bronchial glands. In this case numbness extended down the left arm, suggesting pressure upon the brachial plexus by communicating glands, as in Eskridge's cases. Edema of the feet not accounted for either by cardiac, renal nor hepatic trouble, nor by anemia, suggested a possible pressure of enlarged glands upon the inferior vena cava, which lessened somewhat under a tonic treatment directed to the possibility of tuberculosis. This case is rich in suggestions rather than in positive results.

Voelcker[14] recommends free exploration by resection of ribs and the use of the needle, although the results of this treatment have not been at all brilliant, all dying shortly after its adoption. Since, however, these measures have been used where extensive

cavity formation and even gangrene of lung have been diagnosed, we should not be discouraged. His suggestion that gangrene in these cases tends to extend downward, so that the operation should be a low one in case of doubt, seems to be sound.

Sudden dyspnoea, not otherwise accounted for, especially in a child who from previous disease involving the respiratory tract may be suspected of having breaking-down bronchial glands, would call for the same vigorous measures as if a foreign body had been inhaled. Petersen's case, already quoted, is the only successful one within my knowledge, but, in spite of the often rapidly fatal result of the sloughing of a gland into the air passages, successful removal may follow correct diagnosis in case the patient lives long enough for the attempt.

A very extensive search of the literature leaves me with the conviction that a member of this society, whose case I have reported above, is the only patient who has been reported as having presumably coughed up a sloughing bronchial gland who lived to bear witness of it.

REFERENCES.

[1]Charcot, Traite de Medecine.
[2]Diseases of the Lungs and Pleurae.
[3]Quoted by Osler.
[4]Zeitsch. fur Klin. Med., 1892.
[5]Vierteljahrsch. fur Prak. Heilk., Prag. 1865.
[6]Zeit. fur Hyg. und Inf. Krank., Bd. 13.
[7]Jahrb. fur Kinderh., 1884.
[8]Ibid, Bd. IX.
[9]Ibid, Bd. XI.
[10]Charite Annalen.
[11]Quoted by Marfan (1).
[12]Deutsch. Med. Woch. 1883.
[13]Lancet, February 4, 1899.
[14]Practitioner, 1895.
[15]Virchow's Archiv. Bd. 156.
[16]Nothnagel, Spec. Path und Ther., Bd. XIII.
[17]Amer. Jour. Med. Sci., August, 1899.
[18]Jahrb. fur Kinderh. Leipsig, 1886.
[19]Path. Trans. London, Vol. XXXVI.
[20]Trans. Clin. Soc'y Lond., 1891.
[21]Prag. Med. Woch., 1897.
[22]Bull. Soc. Anat. de Paris, 1897.

[23]Quoted by Quain, 41.
[24]Path. und Ther. Bd. 1.
[25]Trans. Path. Soc'y Lond., 1897-8.
[26]Deutsch. Med. Woch., 1883.
[27]Adenopathie Tracheo-bronchique, 1875.
[28]Arch. of Pediatrics, 1895.
[29]Diseases of the Lungs and Pleurae.
[30]Habershon, Murchison.
[31]Quoted by Fox (2).
[32]Quoted by Fox (2).
[33]Brustkrankh., 1-825.
[34]Dis. of Children.
[35]Dis. of Children.
[36]Traite des Mal. des Enfants.
[37]Ziemssen's Handbuch.
[38]Empis, in Charcot's Traite de Medecine.
[39]Quoted by Barety, 27.
[40]Vierordt's Diagnostic.
[41]Dict. of Medicine.
[42]Diseases of Children.
[43]Krishaber und Riegel, quoted by Fox (2).
[44]Philadelphia Med. News, 1885.
[45]Affections of the Mediastinum, 1889.
[46]N. Y. Med. Rec., 1891.
[47]Quoted by Fox.
[48]Eustace Smith, Wasting Diseases of Infants and Children.
[49]Arch. phys. Heilk., Bd. III.
[50]Sem. Medicale, 1890.
[51]Int. Clinics, 1897.
[52]Quoted by Hoffmann.
[53]Diseases of Children.
[54]Pulmonary Consumption.
[55]Lancet, 1875.
[56]Pediatrics, 1900.
[57]Chicago Med. Jour. and Exam., 1897.
[58]Adenopathie Tracheo-bronchique. Paris, 1887.
[59]Revue Mens des Mal. de l'Enfance, 1892.

Address.

SOME NEUROLOGICAL MEDICO-LEGAL EXPERIENCES AND REFLECTIONS.

BY CHARLES K. MILLS, M. D., PHILADELPHIA.

When through its president and the chairman of its executive committee I received the invitation to address this society, I felt highly complimented by the request, which awoke anew in me the desire I have long had to visit the great West. The welcome given to the American Medical Association by its Rocky Mountain constituents and friends in 1898 will never be forgotten by those who were the recipients of this hospitality, and I have since felt that I not only lost the opportunity of taking part in profitable scientific work, but also was the loser in not then meeting the broad-spirited medical men of this section. I am glad to be here to-day; nor do I feel that I am entirely in a strange land for, although I have never before breathed the pure air of these lofty mountains, around me are former students and colleagues, and I meet on every hand with cordial greetings from those known to me by correspondence, by books, or through the medical press.

Wishing to choose a subject that might be acceptable to all members of this society, and believing that neurology and psychiatry in their relations to the law might be such, I have concluded to direct attention to some matters of medico-legal interest. During twenty years I have with increasing frequency gone into courts of law and before eaxminers, masters or commissioners, or I have given opinions or taken part in conferences with the view of settling litigation cases.

These experiences with the law have been chiefly in insanity cases, will cases involving the question of incompetency or undue influence, and in suits for damages for alleged injury to the nervous system. The cases in which insanity has been the chief issue have represented many different procedures—as those in which the plea of insanity has been made the basis of defense in trials for homicide, habeas corpus proceedings, cases in which insanity has been pleaded as a bar to divorce proceedings, cases in which insanity has been alleged and eccentricity has been the defense, cases in which criminal and civil suits have been brought against physicians who have signed certificates of insanity, cases in which insanity of one party at the time of marriage has been alleged with the view of annulling the contract of marriage, and occasionally cases of a very special character, as one in which a son, in answer to an application to have him dismissed as an executor of an estate, alleged the insanity of his mother. Besides will cases I have also taken part in many in which incompetency to perform other legal acts has been averred. In addition to a large number of cases of the so-called traumatic neuroses, including hysteria, neurasthenia and hysteroneurasthenia, the damages cases have ranged from instances of serious injury to the skull and brain or to the spinal column and its contents, to cases of restricted or trivial injuries to deep-seated or superficial nerves. Mental affections, exophthalmic goitre, chronic degenerative diseases of the neuraxis, and inflammations of the great nerve plexuses have been included in the list.

It would be manifestly unwise for the purposes of a single address to draw too largely upon this experience, and I shall therefore confine myself to a few lines of discussion—as to the effect and value of expert testimony; the causes of its failure and success; the abuses of expert testimony; official expertism; the most important lessons to be drawn from damages cases; and rules for the guidance of medical witnesses.

I have had many curious and remarkable medico-legal experiences, and it might perhaps prove entertaining to spend the time allotted to these remarks in relating some of these, but to do this at length would prevent the carrying out of my chief design, which is to consider, mainly in a reminiscent way, the few

above-mentioned questions in medical jurisprudence in which so much discussion has centered. It may not, however, be a waste of time to call attention, by way of introduction, to two or three unusual cases.

In 1892 I was called to one of the counties in the interior of the state of Pennsylvania as a medical witness for the prosecution in an alleged poisoning case. A young married woman died with symptoms which pointed to poisoning by her husband. A chemical expert having found strychnine in her stomach, her husband was put on trial. During the course of the trial the defense attempted to show that the woman had not died as the result of the administration of strychnine, but of morphine poisoning, or of uremia, or of tetanus, or of epilepsy, or finally that she had not died at all as the result of disease or the administration of poison, but had been killed by the doctor who made the autopsy on her five hours and a half after her supposed death, she being at the time in a state of trance or catalepsy. This five-barreled defense proved effective. The trial lasted two weeks and the jury brought in a verdict of not guilty. I was employed by the prosecution chiefly for one purpose, that of disproving the allegation that the woman was in a state of trance or catalepsy, and not dead at the time when the physician made the autopsy. No real evidence was brought forward to prove that death had not taken place, but the theory, absurd as it was, strengthened the hands of the defense.

During this trial one of the tricks sometimes played on medical experts was resorted to by the defense. The attorney had before him an open book, from which he read a rather lengthy extract on catalepsy. This seemed to have a familiar sound. He then asked whether what was there stated was true. I replied in the affirmative. When he further asked whether the statements in this book were not in contradiction to my evidence, I suggested that he read on, which he declined to do, but of which suggestion the counsel for the prosecution later took advantage. He had read from one of my own articles, hoping to make my published views appear contradictory to my testimony, having ingeniously picked out just that portion of the article which suited his purpose.

The witness should be careful in giving his views regarding books used by the examining attorney. A story is told of one of my friends who seems to have been led into a trap in this way. The lawyer held in his hands a sheepskin volume, the title of which was readily seen. He then read a long passage, and asked the medical witness what he thought of the sentiments thus expressed, also whether he was familiar with the quotation and with the book. The witness replied that the views were correct, that he was familiar with them and with the book, which he had read from beginning to end. The attorney then removed some inserted pages and showed that what he had read was not a part of the book. He had played the trick to show that the witness was untrustworthy.

Time will permit me to refer to only one other unique experience, or rather series of experiences, relating to a degenerate woman. She was the central figure in a train of events which might have furnished the material for more than one sensational romance of the morbid type. Some years since I was first asked by her father through his physician to see this young woman, then in a Magdalen hospital. Her history seemed to clearly indicate that she belonged to the class of so-called moral lunatics, but I declined to join in a certificate of insanity in her case, not because I believed that she was mentally sound, but because I felt that she would not be detained in any hospital for the insane after certification. The woman would have made a favorable impression as regards her sanity if in habeas corpus proceedings she had been put upon the stand as a witness. Not long after this she turned the tables on her ancient parent by attempting to show that he was a lunatic and not competent to execute a deed of trust. The proceedings which followed illustrate that medicine is not the only profession in which disagreements occur. They presented the spectacle of a series of changing decisions, beginning with the finding by the jury that the man was a lunatic. Next came the reversal of the finding by the commissioner before whom the case was heard, then the reaffirming of the jury's verdict by the judges of the lower court, and finally the reversal of this reaffirmation and upholding of the commissioner by the Supreme Court. In the end, from the legal

standpoint, the man remained sane. My testimony was to the effect that the man was eccentric but not insane.

Time went on, and the young woman who had instituted these proceedings inveigled a young man who was possessed of a larger inheritance in money and real estate than in mental capacity into marrying her. Proceedings were instituted to annul the marriage on the ground that the youth was feeble-minded or imbecile. I was called upon to examine him and if possible to testify that he had sense enough to know what he was doing when he had gone into this matrimonial venture; but the case was too much for me, and with another physician I declined to testify to his sanity and competency to make a marriage contract. This case is only one of a number in which I have felt it my duty to decline to give my services in the interests of the party first asking for them. It is too often said that any opinion desired can be obtained for money from a medical expert. The young woman eventually gave up the husband for a comfortable settlement in money and real estate. But this woman's Iliad had still another chapter. Later, but not long after this adjustment, the young woman married an unsophisticated farmer who, one day, finding his burdens too great to bear, killed her, again causing her case, if not herself, to be brought into court.

Even this and other more remarkable experiences have been outdone by the West. Although I have had cases in which electricity has in some way played a part, I have never had one so unique as a St. Louis case reported some years since. A watchman followed by his dog passed near a spot where a live wire had broken and fallen to the ground. The dog treading upon this wire received a shock, which caused him to spring forward and seize and mutilate his master's leg, the incident being witnessed by an agent of the electric company who had been placed there to warn passers-by and who afterwards of necessity became a witness for the plaintiff. The watchman sued the company for damages inflicted upon his person by his own dog on the ground that the animal had been actuated to the commission of this ungrateful and treacherous act by the electric shock, the dog being otherwise a peaceful animal and especially well disposed to his master. This case and all my own cases are,

however, left in the shade by another Western case which came up in connection with one of the numerous tent shows which traverse all parts of our country. Among the attractions of one of these traveling exhibitions was a creature said to be of a higher form of animal life than a monkey and of a lower form than a man, being advertised as the missing link. Great stress was laid upon the fact that no one could say whether the creature belonged to the human or the brute creation. In a scuffle the showman dealt the missing link a hard blow over the ear, from the effects of which the animal died in a few hours. The local authorities arrested the man for murder and at the preliminary hearing his lawyers set up the defense that their client did not take the life of a human being. I have not heard the outcome of this case.

While a further recital of cases of the curious and remarkable sort might easily fill the hour, it will serve a better purpose to now take up the consideration of a few of the medico-legal questions which seem to have an abiding interest to the professions both of medicine and of law, illustrating the points taken and conclusions reached by frequent references to personal experience.

In the first place, let us consider briefly the value of expert testimony and the reasons for its failure or success. What is the effect of such testimony, and why does it sometimes fail when it should succeed, and sometimes succeed when it should fail?

Between sixteen and seventeen years ago I was a witness in a case which at the time attracted widespread interest. A man bearing one of the most honored names in the country was a sufferer from paranoia. He had on several occasions been a certified inmate of institutions for the insane. He had at times shown dangerous tendencies as the result of what he believed to be his persecutions. In a pamphlet printed in his own defense he stated that he more or less constantly heard hostile voices which he was convinced came from his persecutors.

Having been at liberty for some time, and showing evidences of delusion and excitement, he was certified to a well-known hospital for the insane. While there he was again adjudged insane by the findings of an inquisition, the inquiry having been made

on petition of those who believed that he should not only be restrained of his personal liberty, but that he should be under interdiction as regards his estate and affairs. He employed distinguished counsel and traversed the findings of the inquisition before a jury of twelve of his peers. Five physicians, all men of good standing and some of eminence, testified to his insanity. No physician could be found who would come into court and say that the man was sane, the only opposing medical testimony being that of a rural horse doctor. One well-known neurologist who was asked to testify in favor of the man's sanity said that it would be impossible to do so, but said that the case could be easily won by abusing the doctors and disregarding as far as possible the real question at issue. Eloquent speeches were made by the counsel on both sides, and one of the attorneys for the traverser in the course of his address read in a dramatic manner the printed pamphlet written by the alleged lunatic in his own defense, more than once bringing tears to the eyes of judge, jurymen or spectators.

In less than fifteen minutes from the time of leaving the court room the jury returned declaring that the traverser was not a lunatic, was capable of managing his own affairs, and was not a dangerous man to be at large. After a short but vain effort to live at peace in the outside world, the man returned voluntarily to the hospital from which he was released by the verdict of the jury, and from that day to this he has been a voluntary inmate of some institution where the insane are cared for and treated. This case made a powerful impression upon me, and first led me to think over the real value of expert testimony, and to ask myself the reasons for its frequent failure, when from the scientific and even the humane standpoint it should have succeeded.

In a number of cases in which insanity was the issue, and in which the scientific evidence of its existence was overwhelming, verdicts against the evidence were promptly rendered by the jury. In two of the cases referred to the testimony was practically unopposed. In one autopsy showed the presence of extensive organic disease of the brain; in others were many signs of arrested and aberrant cerebral development. In another set of cases the juries promptly agreed with the experts, favoring

the plea of insanity, although in one or two of these their testimony was meagre, and in one was of the flimsiest character. In still another set in which the accused were women, the court did not allow the cases to go to the jury, the fact of insanity being taken for granted without much real evidence. Finally, in still another group verdicts of the second degree or of manslaughter were obtained, although in these from the standpoint of law it was clear that either verdicts of murder in the first degree or an acquittal on the ground of insanity should have been rendered. In these cases the juries apparently compromised between their inclinations to render a verdict in accordance with the evidence, and a desire not to be held responsible on the one hand for the carrying out of the extreme rigor of the law, or on the other for allowing the accused to escape unpunished.

What is the true explanation of the apparent miscarriage of justice in these cases, the miscarriage of science in others, and in still others of both justice and science? Of what value is expert testimony, it is said, if it meets with so little favor from courts and juries, and if antagonistic views are so easily obtained by attorneys?

The reasons for disregarding expert witnesses in such cases are to be found by considering the idea and principles which actuate the vast majority of those who live in the community where such verdicts are rendered. In nearly all the cases the verdicts found favor with the community at large, and this irrespective of the strength or weakness of the scientific testimony adduced. When Guiteau struck down a president the ethical evolution of the American people was such that no array of experts testifying in the most convincing terms to insanity would have changed the verdict. Streams do not rise above their sources. Courts and juries are but the outcome as well as the representatives of the communities which give them authority. He who is capable of making a pathetic plea in his own behalf to be freed from the shackles of others, appeals with success to a love of liberty which is universal, and experts are swept aside by a current which can not be stemmed. That spirit of vengeance which is sometimes just and always existent, and the almost universal abhorrence of cowardice and brutality so far overshadow the knowledge and respect which the community

has for science, that no amount of evidence given by the ablest witnesses is sufficient to overcome the fixed purpose of society to punish the evildoer. The law, or rather the jury in collusion with the law, must furnish a way of escape for the youth who strikes down the traducer of his sister and slayer of his father, even if this be through a verdict of insanity. Whom society wishes to hang it will find a way to hang, and whom it wishes to save it will find a way to save.

Expert testimony, when it is based upon truth, has a real value even when it apparently fails of success in connection with the particular issue for which it is employed. It is one of the means of slowly educating the community at large to a better appreciation of science in its relations to the interests of humanity. Even when the feelings of the community have been clearly in opposition to the views of expert witnesses in cases of great popular interest, the respect for such witnesses is not lost. The community like the jury sometimes says we can not agree with what is said for reasons of our own; nevertheless it may be true, and at least is worthy of respect.

The hope for the future lies in the possibility of elevating the tone of the people so that they gradually come to a better understanding of matters with which experts deal. Slow as has been our progress in law as applied to medicine, and in medicine as applied to law, we have at least risen above the dicta of Sir Matthew Hale, and of the courts when Erskine was an advocate.

Those most disturbed about expert testimony have occupied themselves with schemes for the reform of its abuses, the plan usually suggested being the appointment of official experts. Sometimes they would have the physician sit as the friend of the court, testifying neither for the prosecution nor the defense, neither for the plaintiff nor the defendant; or they would take the cases out of the hands of juries and have them passed on only by the court; or they would have juries composed of medical men, scientists, professional experts, or specialists of some sort.

Such plans have a special allurement just after one has had his self-esteem sorely tried by a verdict against his evidence. He then begins to cry out for something better than our Anglo-Saxon methods.

In France the court may order an investigation and report by experts whenever it deems it advisable. Parties to the issue can agree upon experts, but if they do not the court appoints. In Germany parties may agree upon experts and the court may appoint these, or the court submits experts, a certain number of which may be objected to, the court appointing those which remain. A class of official experts on special subjects exists in Germany, and this class usually has the preference in appointment. Both in France and Germany the court may or may not adopt the conclusions of these official experts.

Can any one doubt that abuses often greater than those under our own system should occur under such officialism? To suppose that injustice is not done is to suppose that those who administer justice under such laws are irreproachable. So far as methods of court procedure are concerned, the published details of the Dreyfus trial were sufficient to convince any dissatisfied American or Englishman that some foreign methods may be worse than his own.

I am opposed to official experts and to every law or proposed law, a draft of which I have ever seen, regarding expert testimony; and my first reason for this opposition is a basic one. The plans suggested have been in one or more respects in opposition to the Anglo-Saxon system of jurisprudence. "They contravene one and all of the three fundamental ideas of our system of criminal trial, to wit, that the judge alone is to be the judge of the law, that the jury alone are to pass on the facts, and that the accused shall be allowed to produce any relevant and competent evidence in his own behalf." (Godkin.)

No system of official experts will ever succeed in this country. Even the "Leeds system," as it is sometimes called because it has had its largest adoption in Leeds, England, is not always to be advised. Physicians who are engaged in expert work would I believe as a rule gladly avail themselves of this method, which is the one advocated by Sir James Fitzjames Stephens, but lawyers and litigants will stand in the way of its general adoption, and it is possible that it may not in some cases best serve the ends of justice.

The gist of this system is that medical men shall refuse to testify unless those called on both sides and by all parties shall

have had the opportunity to consult beforehand with regard to the case at issue. One of the results is that in Leeds the spectacle is seldom seen of physicians giving opposing and therefore conflicting testimony, and hence it is said that the medical profession has a more elevated position in that community. Is this reasoning sound? The correct answer to this query is to be found not in what is reputed to be its effect in a certain community during a more or less limited time, but it is to be sought for in a consideration of all the possible good and evil effects which may result from such a method. When physicians consult with regard to disease or injury in cases in which no litigation is possible, the consultants agree as to the conditions present; or they disagree; or through argument, persuasion, coercion, or reasons of policy, after first disagreeing they come to an agreement or an apparent agreement. One of the chief arguments in favor of consultants announcing an agreement is the maintenace of the respect of the medical profession in the eyes of those who receive their opinion. Real agreement however is sometimes impossible; doctors can not any more than lawyers, judges and engineers always come to the same conclusion. When such honest differences of opinion exist it is manifestly just that a disagreement should be acknowledged.

Let the physicians who are called by the litigants on both sides make their examinations together, and consult about the alleged disease, injury, or issue, but let this be done frankly or freely, and without any effort to come to an agreement for the mere sake of doing this. Otherwise it is better to have no conferences, allowing each expert to state the results of his own observations.

After all the present system is the best, but it does not follow that it is always made use of in the best manner. What is needed is that the medical experts shall be of the highest order as regards intelligence, training, and honesty of purpose; that the study of the matters at issue and the examinations of the persons in interest shall be always of the most thorough and careful kind; that every opportunity to criticize the opinions formed shall be given, and that this shall be done in the light of open day. Where better can this be done than in a court of law?

Recently in Pennsylvania an act relative to expert or opinion testimony has been proposed, and is to be found in the re-

port of the committee on law reform to the Pennsylvania Bar Association, 1899. It is, I believe, intended to present this report or some modification of it to the next meeting of the Pennsylvania state legislature. Copies of the act have been sent to a number of the medical societies of Philadelphia and Pennsylvania, and also to individuals especially interested in expert work. The law is in many respects as good as could be framed for the purpose, but the impossibility under our present system of jurisprudence of framing any statute that will properly cover the subject and control abuses is evident from a careful reading of this proposed act.

As the provisions of such an act might be unconstitutional if made obligatory, the first matter that attracts attention is the fact that the parties need not accept the opportunity to have official experts appointed. It is manifest that this would not be done if either side believed that its interests might be jeopardized by giving up the constitutional right to such expert assistance as might be obtained from any source. It does not follow, as inferred by the act, because certain persons having expert knowledge had been approached by parties to the suit, that they should be excluded as witnesses; nor would the expression of an opinion on the part of those having special knowledge of the subject render them unfit to serve in the capacity of expert, presuming in their honesty of character and purpose.

One section provides that no hypothetical question shall be asked of the official or other expert, and yet subsequently provides for a sort of hypothetical statement. The expert is expected to give his opinion when he does not base it upon his own knowledge of facts of which he has previously testified, upon agreed or undisputed facts, upon the entire consistent testimony of a party or witness, or by a statement upon one aspect and then another aspect of the case, etc. It is out of just such material as this that proper hypothetical questions are framed.

Some of the provisions of this section are worthy of commendation, as when it is stated that the witness shall not be called upon for an opinion unless he believes that what is submitted to him is sufficient for the purpose, and when it is asserted that he shall in no instance be compelled to answer merely yes or no, if in his judgment such answer would mislead or would

state only part of the truth; but he shall be at liberty, subject to control by the trial judge, auditor or referee, to make as full and precise answers as he believes to be necessary in order to state the whole truth. One of the greatest abuses of cross examination of experts is in the efforts often made by attorneys to compel the witness to give simply affirmative or negative replies, using questions purposely framed to make such a reply misleading to the jury. This abuse, however, can be controlled by the trial judge without the necessity of a special statutory provision.

If clause after clause of this proposed act is analyzed, it will be found that it contains much of which every one should approve, much to which objection could be made, and more that calls for neither objection nor approval. Everything that is really good in the law can be secured by the present methods if the law was wisely and justly administered.

Suits for damages based upon the claim of disease or disturbance of the nervous system the result of injuries received in railroad or other accidents hold a prominent place in medico-legal practice. My own experience in this field has been large. These cases are a fruitful source of discussion, sometimes of an acrid character.

The reminiscences and reflections of Sergeant Ballantine, in that most interesting book, "Some Experiences of a Barrister's Life," have sometimes found their counterpart in my own experience. He tells the story of a plaintiff in one case who had no apparent injuries, but in whose case it was stated that he had received a serious spinal shock, the result of which might be fatal. His appearance in the witness box, according to Ballantine, did not support this idea, and his manner prejudiced his case exceedingly. Many thought that he was not candid in giving his evidence; and the statement of the doctors, which gave a very grave aspect to the alleged symptoms, had in consequence less weight than they deserved. A verdict quite inadequate to the injuries if truly represented was rendered. "Within three months," says Ballantine, "the unfortunate gentleman, a comparatively young man, died, and it could not be doubted that his premature death resulted from the effects of the injuries he had undergone, and which had been correctly indicated by the medical men."

The plaintiff in a suit for alleged injuries is sometimes the worst witness in his or her own behalf, even when the case from every point of view is of the strongest character. Some plaintiffs, no matter how much their real sickness and suffering are, when under examination or on the witness stand seem to feel that it is their duty to make their case as bad as possible to counsel, physician, judge and jury. Consciously or unconsciously they fall into habits of exaggeration; they may even make misstatements in order to emphasize their real condition, and on cross examination they act as if it was their duty always to antagonize the attorneys examining them. In these and other ways they make a bad impression and prejudice their case in the minds of jury and judge, and yet medically and morally their cases may be unimpeachable.

Quite recently I had a most instructive experience of this sort. A woman had been seriously injured in attempting to board a trolley car. The case apparently was one similar to several that have been reported in which after surgical traumatisms a symptom picture similar to that presented by syringomyelia or amyotrophic sclerosis had developed. The case had come under my observation at intervals for two or three years, and the symptoms were undoubtedly on the increase. The evidence showed that the plaintiff was well before the accident.

In the first trial her bearing was such and her method of answer under cross examination so pugnacious and irrelevant, that the judge finally ordered the withdrawal of a juror and the case went over to another term. Before the defendant's testimony was presented at the second trial the case was settled by agreement.

Every one who has done much court work probably has had a few experiences like one of another sort recorded by Ballantine, that of a man who was carried into court on a litter, and who, because of his appearance of severe and probably irrecoverable disease received extremely large damages, yet a few months later was seen enjoying himself among the rugged mountains of Wales.

Owing to the necessity for brevity I shall merely state my conclusions regarding some of the most important points usually discussed in connection with cases of this description. Now

and then I have met with a case of unmitigated fraud. In a fair percentage of cases organic lesions of the cranium, spinal column, or of their coverings or contents occur. Many cases of true hysteria, neurasthenia and hysteroneurasthenia result from railway and other injuries, and these cases are justly deserving of compensation proportionate to the degree of their suffering and the probable persistence of their disorders. Exaggeration is comparatively common in cases in which real injuries have been received. Even feigning may occasionally be present in a case which has a just basis in real disease, either functional or organic, giving a state of affairs comparable to the simulation of insanity of one really insane. Disease existing before the receipt of injuries or alleged injuries is sometimes attributed to such injuries. In the vast majority of cases that have fallen under my care or observation some sort of compensation was justly due to those in whose behalf it was claimed.

With regard to these suits for damages for alleged injuries to the nervous system I am glad to say that in Philadelphia and neighboring counties or states in which my experience has been chiefly obtained, the respect for medical expert testimony in such cases has increased, and justice is now more frequently done than formerly, both to plaintiff and defendant. From year to year I have seen a diminution in the number of cases of this sort which go to juries. They are much more frequently settled out of court, or if they get into court not infrequently after the medical testimony for the plaintiff is given a juror is withdrawn and a basis of settlement is reached between the attorneys for the plaintiff and the defendant. The amounts given in settlement of these cases are not as large as those formerly so often obtained by allowing the case to go the jury, and on the other hand just compensation is not often so long withheld through the law's delays. Various causes may have coöperated to bring about these better results. The courts look askance at excessive verdicts; when such verdicts were given the defense was more likely to appeal for a new trial, and, if this was denied, to the supreme court for a rehearing of the case; the defendants have learned to appreciate the frequency with which real, although at times not very apparent, injury occurs; they have also learned that juries, and in many instances the courts, give due weight to carefully presented medical facts and opinions.

Let me in conclusion speak briefly about the physician's conduct as a witness, taking up, however, only a few of the many points which, from the standpoint of my personal experience, could be regarded as of interest. These points, which will be illustrated by some personal references, are (1) that the witness should not go outside of his own province; (2) that his testimony should be relevant and his manner respectful; (3) that he should always tell his story in plain language; and (4) that he should never pose as an expert outside of his own special line of work.

In October, 1884, a convict of the State Penitentiary for the Eastern District of Pennsylvania was tried and convicted of murder in the first degree. During the progress of the trial I was asked by the court whether I believed that a delusional lunatic, or any insane man, if impelled to the commission of a crime by wrath, anger, revenge, etc., was a responsible being, and answered in effect that if an insane man does an act from an insane motive, connected with his delusions, he is not responsible. The next day one of my medical colleagues, also a witness for the defense, wiser in his day and generation than I, when asked by the judge whether a delusion such as the accused had would render him irresponsible, the doctor replied that if responsibility to the laws of the land was meant he thought that it was the province of the court to decide. At that time my view was that when a man was on trial for his life and was being defended from a medical standpoint the question of responsibility was one to be frankly met by medical witnesses. I took the ground that such a question put to a medical witness had reference to the moral accountability of the person under discussion. Later I modified my views and changed my policy as to answers proper to questions of this description. It was held in the instance related, and I now think correctly, that I had invaded the province of the court. My duty was simply to define the mental status of the accused.

A number of times since 1884 I have been questioned on the witness stand as to my views regarding the responsibility of the person on trial. Such a question was propounded to me by the district attorney in a case in Bucks county, Pennsylvania, where I was a witness for the defense. My answer was simply to turn to the honorable judge and say that the responsibility of the ac-

cused did not rest with me but with the court, an answer which manifestly pleased both the court and the audience. In a recent case tried in Camden, N. J., in which I acted as a medical witness for the prosecution, after I had given my testimony, which was to the effect that the insanity of the prisoner had not been established, the counsel for the defense during the cross examination asked me whether in the light of the facts that had been presented, I was willing to say that the man was responsible for the act which he committed. My answer was that I was not an expert on responsibility, the reply being evidently as satisfactory to the court as it was unsatisfactory to my interrogator.

While as a rule repartee on the witness stand is inadvisable, now and then it may be justified by circumstances or by the manner of the cross examining attorney. Occasionally I have seen a quiet and pointed rejoinder lead to a more respectful attitude on the part of the attorney. Once, for instance, I heard a clergyman, who was a lay witness in a suit for damages, turn the laugh on his cross examiner. He had testified that the plaintiff, who was one of his flock, was much depressed and changed since the railroad accident. "You say, Mr. Blank," said the attorney, "that the plaintiff, who is a member of your congregation, has seemed to you to be much more nervous than he was formerly." "Yes," replied the clergyman, "that is true." "But," said the attorney, "you have not taken into account the depressing effects of your sermons; you are a Presbyterian, I believe." "Perhaps not," again replied the clergyman, "but our religion is not without hope, even for lawyers."

A medical witness having been asked the amount of his compensation for his services in the case in which he had testified, and having stated the sum, the attorney on the other side said to him, "Do you not think, doctor, that this is a pretty large sum to be paid for your services in this case?" The doctor replied that he did not think any sum was too large to compensate for a cross examination by Mr. Blank.

The medical witness should learn not to say too much. In a homicide case in the state of New Jersey where I was in attendance as witness for the defense, a well-known surgeon and professor in a medical school of Philadelphia, who was one of the medical witnesses for the prosecution, continued his testi-

mony for the best part of two days, it seemingly being impossible not only for the counsel for the defense but also the counsel for the prosecution and the presiding judge to curb his volubility and prolixity. He managed to bring in a large part of his own life history and various references to his illustrious progenitor. When called upon to give the facts regarding the probing of a gunshot wound he introduced a statement regarding Nelaton's probe, giving some account of the French surgeon, also of his attendance upon Garibaldi, where this probe was first used, incidentally bringing in many interesting but unconnected facts regarding the history of probes and of surgeons and military surgery in general. The lecture of the witness was doubtless interesting to many of his court house auditors, but it was a waste of time, and most of what he said had little or no bearing upon the case in hand. Usually such a procedure will not be allowed, but medical witnesses often give instances less extreme of unnecessary diffuseness. The witness should state what he has to say as fully and clearly as necessary, but no more.

It is possible, although it is exceptional, for a witness to be too brief through nervousness or modesty; or perhaps through ignorance he may fail to answer fully the questions that are put to him, and what is ordinarily a virtue may become a fault. Yes and no are not always sufficient, and an answer may be condensed by omissions rather than by a skilful use of language or of a commendable employment of self-restraint.

Many years ago in a case which attracted widespread attention, one in which insanity was the issue, I was cross examined at great length by one of the then recognized leaders of the Philadelphia bar. I regarded myself as thoroughly posted in the case in hand, and such questions bearing upon the real facts and issues of the case as were asked were easily or at least readily answered. To my surprise, although the examination was prolonged, questions pertinent to the issues were very few. My cross examiner seemed bent upon keeping me as far away from the real question as possible. This indeed was his plan of operation, his object being not to bring out the truth but to get "jury points," and win his case. He was rewarded for his efforts by obtaining a verdict in favor of his client. Such a method of cross examination is perhaps essentially unjust, but the latitude

allowed to counsel by most courts is such that it will not be interfered with as a rule. It is perhaps admissible on the ground that the cross examining counsel have the right to show any defects, prejudices, weaknesses or other shortcomings in medical experts in order to cast a doubt upon the general value of their testimony. The best thing for a medical witness to do under such circumstances is to not resent what seems to him to be an injustice, and not to speak of the irrelevancy of the examination, but to answer as coolly and clearly as possible all questions put to him. A medical witness has nothing to do as to the decision of what should or should not be asked him. The court should protect him, or if the court does not see fit to do this of its own volition the attorney who has secured his services should make proper objections and see that the witness is protected. Often such methods of cross examination do more harm than good. They weary the jury and in some instances reveal their own innate foolishness or worthlessness.

The cross examiner least to be feared by a medical witness who has had experience and who is properly prepared for the work in hand by a thorough knowledge of the case, is one who attempts by declamation, brow-beating or irrelevant questioning to pervert his real meaning and break down the force of his testimony. An English judge once said to a noisy, brow-beating attorney, "Mr. Blank, you seem to think that the art of cross examination is to examine crossly." Such a method of examination need never be feared by an intelligent witness, whether lay or medical. The examiner should be met simply by a cool and dignified demeanor on the part of the witness.

Address in Surgery.

SHOULD STRICT ASEPSIS BE DEMANDED OF THE GENERAL PRACTITIONER IN ACCIDENT SURGERY AND EMERGENCY OPERATIONS? WHY? HOW CAN HE DO THIS MOST SUCCESSFULLY?

BY CHAS. B. NANCREDE, M. D., ANN ARBOR, MICH.

Mr. President and Members of the State Medical Society of Colorado: Casting about in my mind for a subject the consideration of which might be of interest to all practitioners of medicine rather than to the limited number who practice surgery, it occurred to me that a brief attempt to answer the following questions would prove both interesting and profitable: "Should strict asepsis be demanded of the general practitioner in accident surgery and emergency operations? Why? How can he most successfully attain asepsis?"

Although the whole subject may appear trite, the questions propounded are most pregnant ones, because nothing which promises relief of human suffering and concerns the saving of human life can ever fail to be of vital interest to the profession.

With but few exceptions the subject of antisepsis and asepsis has been treated of from the standpoint of the operating surgeon, forgetful of the dictum of Nussbaum that "the fate of the wounded is in the hands of him who first sees him." Moreover the courts have frequently decided that neglect of modern methods of wound-treatment is so culpable that it behooves us to see to it that we secure the best attainable asepsis, even in emergency practice.

I am firmly convinced that the whole subject of antisepsis and asepsis has been rendered apparently complex, and therefore unattainable by any but experts, because those advocating it are themselves often woefully ignorant of the essential principles upon which success depends; upon the one hand laying stress upon troublesome and unimportant details, and upon the other announcing some royal road to success for the general practitioner which proves a delusion and a snare, because in direct contravention of some essential principle of asepsis. Soon the practitioner comes to believe that the attainment of asepsis is impossible outside of a well-equipped hospital, applies those methods which he employs in a half-hearted manner and, seeing the frequent failures of the supposed expert whose methods he tries to follow, is secretly encouraged to be more and more lax in his own practice.

A brief review of the evolution of asepsis in surgery will, I trust, explain the reasons for some of the unfounded claims made in the past, why these were made, how gradually exact facts took the place of ex cathedra statements, and thus put you in possession of the few essential principles involved.

Thus informed, if you are in earnest, you will secure under the most favorable circumstances as perfect asepsis in emergency work as the most expert surgeon, while with the worst environment you will also secure all that any hospital surgeon can or the law demands of you. Again, clearly apprehending the full applicability of my statements, you can then detect the causes of failure in the practice of others, and thus be able to avoid future trouble and add to instead of lessening your faith in asepsis. Understanding that my time was limited to twenty-five minutes, I have endeavored to compress within the smallest possible limits the ideas I wish to convey to you, asking you to remember that, although illustrations of the application of principles can be multiplied indefinitely, the essential principles themselves can be stated in a few words. I shall therefore make no effort to sustain the truth of my contentions by either argument or extended illustrations, leaving it for you to read between the lines.

Much confusion has arisen from confounding the methods of applying the principles of asepsis and the principles them-

selves, whence follows, of necessity, neglect of some minutiæ which seem to the ill-informed of trivial importance, yet their omission inevitably leads to vitiation of the results because some principle has been unwittingly contravened. Bear in mind that Lord Lister's theory of suppuration and wound-treatment *was only a theory*, a daring application of the scientific use of the imagination, as Tyndall calls it, until Koch established bacteriology upon a scientific basis; then, and then only, had Lister's theory a basis of scientific facts. Nay, more, soon some of his ideas were seen to be erroneous, yet they still remain as stumbling blocks in the path of many surgeons, looming up in such gigantic proportions as actually to hide from their sight some of the facts essential for the successful practice of Listerism. I shall not strictly observe the historical order of events, but shall rather endeavor to place in their proper relation the epoch-making discoveries and briefly indicate the changes of practice necessarily following the discovery of each new fact.

The observation that fluids containing organic substances would remain unchanged for long periods if contamination by air germs was avoided, and the further fact that a certain disease of the grapevine was due to microscopic organisms, led Lister to infer that suppuration in wounds resulted from the action of air germs falling upon the field of operation before but chiefly *during* operations, upon the instruments and sponges, upon dressings and the operator's hands; note carefully, "upon the surfaces of the objects mentioned." To meet this source of infection the spray was employed, preceded by a mere rinsing off of the *surfaces* of the field of operation and the surgeon's hands with a solution of carbolic acid, and followed by irrigation of the wound itself with the same to remove any germs accidentally reaching it despite the spray, the carbolized veil, etc. The sponges and dressings were also impregnated with germicidal drugs to destroy the germs they originally contained, but particularly those settling from the air during the course of the operation. Wonderful results followed, but they were not uniform, pus being often formed, while micro-organisms could be found in the wound discharges, even when these were not purulent, as was often the case. Bacteriological study eventually proved that the patient's skin, even the deeper layers of the

epidermis, the surgeon's hands, and the dressings, in spite of the free use of germicidal drugs, were a more prolific source of micro-organisms than the air. Of equal importance was the demonstrated fact that pathogenic organisms differed much in their virulence, and that the tissues could cope with a considerable number of bacteria provided their normal resistance was not reduced by previous disease, the use of chemical germicides, or severe traumatism from injury or during operation. In fact, the air has been shown to rarely contain any but non-pathogenic moulds in private houses or properly cared for operating rooms, unless currents of air set actual dust in motion. Nevertheless, the idea still haunts the practitioner's mind that the chief source of wound complications is germs deposited from the air, this erroneous view leading him to neglect far more dangerous sources of infection. Continued investigation, stimulated by the failure of chemicals to destroy bacteria under many clinical conditions, further led to the discovery that heat, and heat alone, could be relied upon to sterilize dressings, instruments, and above all, ligature materials, especially if the latter were made of animal tissues which often contain bacteria peculiarly resistant to chemical germicides; indeed, these latter have been finally shown usually to act only as inhibitors of germ growth in the strength employed, especially in wounds, and but exceptionally as true destructive agents.

Nearly all these difficulties have been surmounted, but method after method for sterilizing the hands has been proposed, each heralded by the claim of infallibility, and still the hands cannot with certainty be made absolutely germ-free. It is true that by the best methods they can be made so nearly germ-free as to be innocuous when thrust into the depths of a wound, yet it too often proves true, as Kocher has shown, that hands, which of themselves will not directly infect, will infect a perfectly sterile ligature tied by these same hands, because the ligature carries with it microscopic masses of epithelium containing bacteria from the deeper layers of the epidermis, incorporated with the thread by the abrading action of tying.

I wish here to reiterate for the purpose of emphasis two important points, viz., the reasons why the majority of wounds do well if the best methods of hand sterilization are adopted, even

if the hands are often not absolutely germ-free; and why wounds present no evidence of disturbance whose non-purulent discharges can be proved to contain micro-organisms.

Scientific investigation has shown, as I have already pointed out, the differing degrees of virulence among pathogenic bacteria, some requiring a peculiar combination of favoring circumstances to render them harmful, and that the healthy tissues can resist the action of a considerable number even of the more active forms, hence the degree of freedom from micro-organisms on the hands which can be secured with due care is often compatible with undisturbed repair. The bacteria detected in the wound-discharges are those which have found it impossible to gain a foothold in the tissues and multiply there to a sufficient number to interfere with the processes of repair. These investigations have also taught us that the difficulties in the way of sterilizing the hands are so great, and in certain emergencies of practice, as upon the battle field and after recent fouling of the hands, are so impossible, that some absolutely reliable device must be adopted to insure safety under such circumstances, or to secure anything like uniform results even with the most favorable environment.

Do not misunderstand me. If the ligatures, sutures and drainage materials are put into the wound aseptic, the comparatively innocuous germs impossible to entirely remove from the hands will rarely do harm. But what if from carelessness, lack of facilities or lack of comprehension of principles the aseptic ligature or drain becomes infected by the imperfectly cleansed hands, and in false security we attempt that which we would not otherwise dare to do? Disaster will surely follow. Let me relate a recent personal experience. Despite a most rigid enforcement of the best methods of disinfection of the assistants' and nurses' hands, including my own, repeated *late* infections were observed in my clinic. The dressings, ligatures, the field of operation, were all examined bacteriologically without any adequate explanation of the suppuration, until the ends of the ligatures cut off after tying the vessels during the operation were examined. These, proven before handling to be aseptic, now contained the same germs upon their surfaces as those found upon the hands of the assistant, who was observed to be in the habit

of frequently straightening out the bundle of threads by smoothing them down with his unoccupied hand; the same germs were also found in the pus from the late suppurations. The employment by this assistant of a device which I shall presently describe at once reduced the number of infectious cases, while the cut ends of the ligatures no longer contained microbes, as shown by culture experiments. No deluging of a wound with irritating yet inefficient germicidal solutions will prevent late trouble from infected ligatures. It is as Tait, the scorner of asepsis yet the one who profited so much by it, says, it is the "deadly hand" which, because it so often cannot be surely disinfected, does most of the harm.

Is there, after all, any means known to science whereby a perfectly aseptic hand can be secured and maintained? Yes, provided that the sterile hand is not subsequently allowed to come in contact with any extraneous objects which have not been rendered aseptic, for experiment has amply demonstrated that no object, however clean it may be to the eye, is really sterile unless specially treated. If this accidental contact with septic substances is either unobserved or not remedied, trouble is the rule; yet, under such circumstances, surprise is often expressed and doubt of the efficacy of modern methods is too often confirmed, because it is said, "All Dr. Blank's directions were carried out, yet sepsis followed just as if no precautions had been taken." Still further, in the face of repeated experiments, borne out too fully by clinical experience, proving the folly of relying upon the use of so-called germicidal solutions for the destruction of germs which have been carelessly allowed to gain access to a wound or contaminate the operator's hands, this great service rendered us by science is persistently overlooked by too many surgeons, who then blame Listerism instead of their own stupid or ignorant neglect of the principles which have been shown both by experiment and experience to be essential for success. Thus, I have seen a surgeon employ the most elaborate precautions for an abdominal section and then, in the midst of the operation, take out his pocket case, abstract from it a roll of sulphurous acid chromicised catgut, carelessly wash it and his now septic hand in a sublimate solution, and then express surprise that the patient died in a few days of sep-

tic peritonitis. This is not a solitary exception, but the same defiance of the teachings of science is seen in a different form in the continued employment of chemically sterilized gut, in face of the repeated demonstrations of the unreliability of anything but caloric for this purpose. *After sterilization by heat* some prefer to impregnate the ligature with a germicidal substance, but this is far different from *trusting to the germicide to render the ligature sterile.* Still further, this expedient is entirely unnecessary if the ligatures and the tissues are handled with absolutely sterile hands, as I hope I can show you can be done.

If then, an experienced surgeon, with all the theoretical and practical knowledge of the subject of asepsis available at his disposal, cannot so insure disinfection of his own or his assistant's hands that he can always safely operate upon normally resistant tissues, should aseptic hands be either exjected or demanded of the general practitioner, who may at one time dress a suppurating case of erysipelas, at the next call handle a scarlatinous patient, and then be compelled shortly after to thrust this same hand into a contused, perhaps lacerated uterus injured by a severe labor, or dress the partially devitalized track of a gunshot wound? Yes, I confidently answer, it is is for the very reason that the general practitioner cannot avoid contaminating his hands as the surgeon and his assistants should and can, and because he first sees many injuries, that hand-asepsis is imperative for him. Recognition of this duty will do away with the necessity for many an operation and save many a life, while neglect of asepsis will render nugatory the highest surgical skill, vainly exerted in the face of a serious infection, the direct result of the criminal carelessness of the general practitioner. You can rest assured that in time the position I am contending for will be unhesitatingly recognized as correct, viz., that it is even more the duty of the general practitioner to be aseptic than for the surgeon. Ponder over the results of wound-treatment less than twenty years ago, when a prominent writer contended that the average mortality for amputations in the best hospitals of England and America was from 25 to 33 per cent., and records, with pride, that his own mortality was only about 20 per cent.! Think of the occurrence of pyæmia in the same institutions in 9 per cent. of all amputation cases, and a death rate

of 30.1 per cent. from the same disease in those cases terminating fatally! Go further back and imagine the condition of surgery when Benj. Bell could say that long after the invention of the tourniquet more than one-half died who submitted to amputation, i. e., that about two out of three patients perished from sepsis or secondary hemorrhage, the result of infection! Contrast this with the worst results of asepsis. See how, under most unfavorable circumstances, as upon the firing line, asepsis has been so well maintained that amputation or death from sepsis has become a rarity after smashes of bone or perforation of large joints by bullets. Recall the death rate in maternity and private obstetric practice of only a third of a century ago and that observed to-day when, if a death occurs, it can usually be shown that had clean hands been secured the disaster would have been avoided, and learn from such cases how readily, *just in proportion as we sin against light*, can all these horrors of the past be reproduced. I am perfectly willing to admit that other factors have been operative in securing our modern triumphs, but they are only of minor importance, while the reasons for their success and the necessity for their continued employment have been revealed by the students of asepsis. Asepsis, the logical outcome of antisepsis, is the only adequate explanation of the vast differences observed between the past and the present. It is my deliberate opinion that any practitioner who through either ignorance or neglect omits any of the safeguards placed at his disposal by science for the protection of his patients against disease, should he lose the case is morally guilty of the death and should be held legally responsible. Consider the sanctity of human life, and then decide whether you will deliberately peril it because too lazy to acquire the requisite knowledge or, if you possess this, to practice it. I say "peril life," for nature may prove both more kind and more powerful than the doctor.

Asepsis being then of such paramount importance and hand sterilization so difficult, if not impossible, especially for the general practitioner, what can be done? Wear rubber gloves, after thorough cleansing of the hands by some approved method, to dress all wounds, perform any operation, or attend any case of labor. Boiling for a few minutes will render these gloves absolutely sterile. Where boiling is impossible, or the glove becomes

accidentally fouled, soaking for five minutes in a solution of corrosive sublimate of a strength of 1-1000 or carbolic acid 5 per cent. will render them aseptic. Of course all traces of grease must be removed by soap and water before placing in corrosive sublimate or carbolic solution, and all traces of these drugs gotten rid of by sterilized water or alcohol before operating. Where neither alcohol nor sterilized water is obtainable, the strong solutions should be removed by weak solutions of the germicide. I have also had demonstrated by one of my assistants that mere washing with abundance of soap and water (preferably hot) will render sterile rubber tissue on which pure cultures of pyogenic organisms have been smeared. Washing with alcohol or a sublimate solution will do the same. Of course I only recommend these procedures for emergencies where boiling cannot be resorted to, or for fouling of the gloves while using them. Certain precautions must be observed in their use. They can best be put on by filling them with sterilized water or a germicidal solution and then, turning down the gauntlet part, slip the fingers in, carefully following with the thumb. After both gloves are on rinse off their outer surfaces with a germicidal solution or sterilized water, lest the water escaping from the interior of the gloves while putting them on contain germs from the imperfectly cleansed hand. When removing them, dip them in water and turn them inside out, dry them carefully, and dust them freely with powdered talc. If punctured during an operation a thin finger-cot must be pulled over the finger. After operation most tears and all punctures can be readily repaired with cement obtainable from the makers. Thus cared for a pair of these gloves can be used for months in an ordinary practice. The loss of tactile sense is less than would be believed, and one soon becomes accustomed to the modification of the sensations. If tissues, such as the intestines, are too slippery to hold, a piece of gauze will obviate all difficulty, and the same expedient must be adopted when tying a thick pedicle lest the glove be torn. Those who use gloves must learn to be cautious how they use hemostats, needles, etc., to avoid cutting or puncturing the gloves, but a little practice is all that is requisite. Needle forceps must be used, at least to withdraw a needle, otherwise the glove will surely be torn.

Owing to the risks of tearing a glove, the possibility that water from within the glove may flow over its outer surface, and the risk attendant upon yielding to the temptation of pulling off the gloves when embarrassed by difficulties in manipulating parts, I shall state what I believe to be the best method of preparing the hands for the gloves.

Mechanical removal by friction with soap and hot water of all dirt under and around the nails and the more superficial layers of the epidermis which harbor so many micro-organisms is the main object. To do this effectually, boil your nailbrush, use green soap to which has been added 2 per cent. of formalin solution, or 5 per cent. of hydronapthol. Scrub vigorously with this for at least ten minutes by the clock, using hot water frequently renewed; clean the finger nails, which should be kept short, with a sterilized nail cleaner; again scrub the hands with another sterilized brush and hot water for a couple of minutes, then soak the hands in alcohol three minutes by the clock. By soaking the hands for a further three minutes in a 1-1000 corrosive sublimate solution, and dipping them occasionally into the same during a prolonged operation, I believe in any case where for good reasons gloves are not obtainable you can, in most instances, secure aseptic results if you wrap the fingers in gauze while tying the ligatures so as not to infect them. I do not think that if gloves are used there is any necessity for the soaking in a germicidal solution, an advantage for those susceptible to the action of mercury. If the gloves are so torn during an operation as to be useless, either a new pair must be put on, or careful sterilization of the hands must be again effected, lest germs have come to the surface of the hands during the time which has elapsed since the gloves were put on.

Would I recommend careful asepsis for already infected cases? Most assuredly. Why should I add fresh, and perhaps more virulent pyogenic organisms to those present? Why should I implant tetanus germs, perhaps, in the suppurating wound? I would also call your attention to the security against infection enjoyed by the surgeon.

Does all that I have said seem unnecessarily troublesome? Can I truthfully affirm that even with all these precautions failures will not result? In answer to the first query I say, would

you like any precaution neglected, because troublesome, if *you* were the patient? If this is true you are bound to do for your patients what you would demand for yourselves. The second question is properly answered by saying that the precautions I have advised have been shown by numberless operators to be those followed by the fewest failures.

What measure of success should we expect to attend the efforts of the general practitioner to secure asepsis, many of whose cases are infected when first seen by him, and who cannot command anything like the facilities which too often fail to secure the best results even for the hospital surgeon? If the majority of his wounds and operations proceed aseptically or with only a slight local infection; if the remainder, notwithstanding a severe infection, escape perhaps only with their lives at the expense of some loss of function, or possibly eventual sacrifice of a part, if a limb be concerned; if few deaths result from any form of wound infection; and if all labor cases, free from any possible infection-focus before labor, proceed without infective disturbance during the puerperium, the results are all that the most exacting should demand.

I shall in conclusion recapitulate the sources of infection and the means of avoiding them:

1. Air-germs can be ignored if strong currents of air be avoided.

2. The field of operation can be rendered practically aseptic, especially as the deeper layers of the epidermis which contain the germs impossible to remove are usually mechanically excluded from the wound proper by the apposition of the derm by suturing.

3. Mechanical removal of germs by friction, assisted by agents such as alkalies which tend to disintegrate the superficial layers of the epidermis, should be the chief means employed to secure asepsis of the field of operation and the hands.

4. Alcohol is preferable to ether for the removal of grease, as it dehydrates the deeper layers of the epiderm, thus tending to destroy or inhibit the growth of the germs there resident.

5. Caloric is the only thoroughly reliable agent for the sterilization of ligatures, dressings and sponges.

6. There is no certainly reliable method of sterilization of the hands which renders it safe under all circumstances to tie the ligatures with bare hands.

7. Hence it is our duty to use gloves when tying ligatures and, when possible, at every stage of all operations and during the dressing of all open wounds.

8. Armed with a pair of these gloves the practitioner can be independent of everything but water and soap, and can protect his patients from the chiefest danger—namely, his hands.

9. Obstetrical cases can be most safely handled with—namely, gloves, especially if active intervention, as the mechanical removal of the placenta, be necessary.

Papers.

EARLY CORRECTION AND EDUCATIVE TREATMENT OF CONVERGENT STRABISMUS.

BY WM. C. BANE, M. D., DENVER, COLO.

The medical profession and the public are greatly indebted to Javal and Mr. Priestly Smith for the development and practical application of the educative treatment of strabismus. My object in bringing up this subject is to emphasize its importance.

A large proportion of the cases of convergent strabismus become manifest previous to the age of six years,—possibly as many as eighty-five per cent.[1] It is the prevailing opinion among ophthalmologists that nearly all children are hyperopic at the time of birth, and when they have reached the age of six years some hyperopia still remains. In eighty per cent. of the cases of convergent strabismus refracted under atropine by Mr. Priestly Smith, two dioptres and over of hyperopia existed. At birth the vision is not acute, and by the time the school age is reached may still be below 6/6 in what might be termed emmetropic eyes.

In a considerable number of strabismic cases the vision of the deviating eye is found to be amblyopic, whether congenitally so, or not having developed after birth in keeping with the fellow eye, is a question not yet determined. Nature endeavors to see as clearly with one eye as with the other. It is manifestly Nature's rule to not keep up what is not used. Of the changes that take place in the visual centre of an amblyopic eye we can but conjecture, but we have reason to believe that the cortical

[1]Priestly Smith, British Med. Journal, July 2, 1898.

cells of the controlling centres will degenerate in keeping with the peripheral atrophy resulting from disuse of the part or organ. We can readily understand why an eye that is unequal to its fellow in development, or is greatly defective in shape, should give up the race and turn aside, at first periodically and then constantly, either ceasing to develop its perceptive power or to permit its rays to impinge on the macula.

The method of correcting strabismus varies in keeping with the cause and character of the deviation, whether periodic or continuous, alternating or mono-lateral. As most of the cases of converging strabismus develop previous to the sixth year, the important question with parents, as well as with the family physician, is whether to put glasses upon so young a subject, have an operation, or wait until the child has reached its growth. As many of the cases may be cured at an early stage by the proper adjustment of correcting lenses, it is incumbent upon the parents as well as the family physician to see that such patients receive attention as early as possible. It may seem superfluous to say that the eyes of such children should not be measured by an optician, but by a competent physician.

Mr. Priestly Smith's report shows that sixty per cent. of his five hundred and seventy-six cases were under four years of age,[2] an age too young for the average child to have learned the alphabet. With the accommodation of these young subjects at rest we have in the use of the shadow test a means of accurately measuring the errors and are thus enabled to correct them without the standard letter test. Hyperopic cases of convergent strabismus may be cured if the glasses are worn constantly; especially is this true of the intermitting or periodical type. Some intermitting cases may be cured by proper glasses, even though of several years' standing. With the full correction of the errors, the educative treatment should be instituted in all suitable cases. By this we mean the use of the occlusion pad, by which the better eye is covered for several hours daily, thus compelling the patient to bring into use the converging eye. Mr. Priestly Smith, who has used the pad or shade in thirty-eight cases, generally in conjunction with spectacles, states that five out of eight

[2]The Lancet, September 23, 1899.

cases of false fixation recovered the faculty of true fixation during the use of the pad. The older the child the smaller the chances of restoring lost fixation. "It is not only useful in restoring a function which is impaired, but in preventing such impairment. In a minority of cases, chiefly of periodic strabismus, it is superfluous; in long standing cases where fixation power is irrevocably lost, it is useless; in the larger majority it is a most important means in promoting recovery of binocular vision."

The function of true fixation may exist, or, having been lost, be restored by bringing the eye into usé. Again, true fixation may exist and the function of fusion be lost, so that true binocular vision is wanting. In long standing cases it may not be possible to bring about binocular vision. If, after a few months' persistent treatment, with the occlusion of the better eye, fusion is not brought about, and no further progress is being made, an operation should be performed and the educative treatment continued. Mr. Smith does not hesitate to advocate a tenotomy by the direct method on a child but two years of age, when no further progress can be made by the use of the glasses and pad. By operation we mean tenotomy, or advancement, or the two combined. Recently the operative treatment known as the Panas' method has found an enthusiastic advocate in Dr. St. John Roosa. It consists in stretching the muscles before dividing them.

On February 11, 1899, A. H., aged seven years, was brought to me on account of squint. His parents had noticed that for three months his right eye was turned inward. Vision R. E. = 6/12, L. E. = 6/6: Pupils were equal and responded normally to light and accommodation. He had a convergence of 2½ mm. for near point and 36° of esophoria or convergence for distance. Three dioptres of hyperopia existed in his right eye and one and a half dioptres in the left eye. Correcting lenses were ordered to be worn constantly and the left eye covered with a pad or shade several hours daily. Three months after the correcting lenses were put on, V. R. E. = 6/6, L. E. 6/6. When either eye was covered no deviation was manifest in the near or distant tests, yet the test with spectacles on and a 6° prism base downward in front of the left eye revealed 6° of esophoria still remaining.

Nine months after the lenses were put on, orthophoria or perfect balance of the muscles existed.

On January 26, 1900, N. M., aged eight years, was brought to my clinic at the Denver College of Medicine with a history of having had converging strabismus for two years. The squint alternated, but the right eye was used more than the left. He suffered with pain in his eyes and forehead upon use of eyes for close work. V. = 6/9 with each eye. Pupils equal and responded normally to light and accommodation. Fields for white normal. A shot silk appearance of the retina of each eye was marked. Convergence of twenty-seven centrads. Hyperopia of one and a half dioptres in each eye. Correcting lenses ordered to be worn constantly. Four months later no convergence was manifest with spectacles on, but soon reappeared upon their removal. His eye ache and headache have ceased.

In concluding this brief article, I would emphasize the following points: (1) Examination of the eyes at the earliest possible moment upon the manifestation of strabismus. (2) The correction of any errors of refraction with spectacles, even though the child be but two years of age. (3) Use of the occlusion pad on all suitable cases. (4) Operation as early as there is positive evidence that further gain can not be made by the educative treatment alone.

EXHIBITION OF SIDEROSCOPE, AN INSTRUMENT FOR THE DETECTION OF IRON OR STEEL IN THE EYE.

BY WM. C. BANE, M. D., DENVER, COLO.

The instrument I bring before you I constructed on the principle of the sideroscope of Dr. Asmus, of Dusseldorf. I am indebted to Dr. Jackson for the loan of a German edition of Dr. Asmus' work, descriptive and illustrative of the sideroscope, which was issued in 1898.

The instrument is simply a magnetized rod of steel two mm. in thickness, and eleven cm. in length, suspended by some fibres of raw silk. The silk and rod are protected from the air by glass tubes. On the center of the bar is attached a small mirror ten or twelve mm. in diameter. The instrument is so placed that when the magnet is at rest, the ends are respectively north and south. The room being darkened, a light is thrown onto the mirror, from which a beam of light is reflected onto a scale, the scale being so placed that the beam of light will strike it at the zero point.

I used the instrument on a patient, February 6, 1900. The eye was cocainized and gradually brought in contact with the glass tube in which was suspended the magnetized bar. The bar was at once attracted towards the eye, giving positive evidence that the organ contained a piece of iron or steel. I enucleated the eye ball, and upon opening it found a chip of iron in the fundus of the eye near the optic nerve entrance, enclosed in a mass of inflammatory deposit. The piece was nine mm. long by three mm. wide at one end and tapered to a point at the other end, being one mm. through its thickest part. One edge was quite sharp. Weight, one grain.

A great deal has been claimed for the sideroscope in not only detecting the presence of iron or steel in an eye, but in also locating it.

The instrument I show you is much the same as the Asmus instrument, and certainly responds promptly when a bit of iron or steel is brought within close range. To use it properly, and for delicate testing, it is necessary to have it on a solid foundation, that it may get perfectly quiet, and at the same time be removed several feet from iron or steel and electrical currents.

DISCUSSION.

Dr. E. W. Stevens: For the purpose of treatment, cases of strabismus may be divided into two classes. In the first class are included those cases which have not yet given up binocular single vision—the periodic cases where the squint comes on when the child is tired or when he uses his eyes for near work, the eyes at other times being straight. These are the cases that

are amenable to treatment by glasses, and our success in treatment will depend solely upon our ability to correct the error of refraction. All other methods of treatment are secondary to the wearing of proper glasses. Owing to the early age at which the squint usually develops, before the child has learned his letters, it is impossible to make satisfactory use of any subjective method of measuring the refractive error, as by means of the test card and trial case. With the shadow-test, however, we are enabled to measure these errors and prescribe glasses with great accuracy, and we have found that the wearing of the glasses banishes the squint in most cases. The second class of cases includes those squinters who have given up binocular vision. The squint is fixed and constant, and generally requires for its correction a tenotomy in addition to glasses. It is of the greatest importance that all cases of squint come under treatment in the early stage.

Dr. G. M. Black: Mr. President, I would like to say a word about the sideroscope. For instance, it was brought to my notice by Dr. Bane, and I manufactured one. It is unquestionably of inestimable benefit in the discovery of foreign bodies in the eye. If we can have an opportunity we can see the foreign body within a short time after the injury, but in time the eye becomes clouded and we are unable to determine positively whether there is a foreign body there or not. With this instrument it is possible to detect a very small particle of steel. This instrument will have no effect whatever upon brass or upon non-magnetic metals; but by steel or iron it will immediately be attracted.

Yesterday I extracted a bit of steel from the vitreous chamber of a boy. I saw the case three days ago, within half an hour of the injury, and could see the piece of steel. I used the instrument to see how it would work, and it worked beautifully. It was a very small piece of steel, showing the extreme sensitiveness of this instrument.

Dr. Edward Jackson: In reference to the first part of Dr. Bane's paper I would like to emphasize the conclusions reached in the first class of cases Dr. Stevens spoke of, in which binocular vision is not entirely given up. The pad is not simply useless, but it is worse than useless there—the shutting off of one eye favors the establishment of the squint. It is useless where the eyes

alternate, because there the patient is doing already what you want to accomplish by the pad, and preserving the vision and the visional centers of both sides without any such treatment. It is where the squint has become constant and is fixed in one eye—where one eye constantly squints or is properly directed and quickly deviates again, the other one fixing, and in the early stages—that there is an important field for the use of the pad, and it might be done in many cases with great advantage, even simply as a temporary measure to prevent the establishment of the squint.

In reference to the second part of the paper I would like to say a word about the relative value of the sideroscope as compared with other methods. When we have a foreign body—and it is usually a piece of iron or steel—in the eye, although of course these other methods most of them apply only to that, we want to do two things and both of them are very valuable. When you are sure the foreign body is within the eye—and that can certainly be done, if it is a piece of iron or steel, with such an instrument as is shown here, and with no better isolation from things that would affect it than you have here in this room —probably this sideroscope will show the presence of smaller particles of iron or steel than can be detected in any other way except with the ophthalmoscope. The examination must be made just as quickly after the injury as possible, and will usually reveal the presence and location of the foreign body. After a few hours it is comparatively rarely that the ophthalmoscope will do that; and after that the sideroscope is, I think, the most delicate instrument—and this instrument, although it does not look as well as those that come out of the brass workers' shop, is quite equal to any of them. And this is certainly more delicate and will show a smaller particle of iron or steel than can be shown by the Roentgen rays. Those are superior to the sideroscope for locating a foreign body, but they will not show small particles of iron or steel such as are shown by this instrument.

Now, the other method that is used is with a large portable magnet. This is attached to the ordinary electric light current and that gives it a sphere of magnetic influence of two and a half inches, and when the eye is brought within that sphere the magnet causes a certain movement of the foreign body and in that

way causes pain in the eye; that shows the presence of the foreign body, which is influenced by the magnetic force. Now, by bringing it to the eye from different directions—and the same is true of bringing the different parts of the eye nearer the magnetized bar in the sideroscope—we can locate foreign bodies with this instrument, but not equal to the location to be obtained by the X rays, and the location is probably always somewhat uncertain except with the X rays. But when it does give positive indications they can be relied on.

The sideroscope, however, is more reliable as regards the presence of a foreign body in the eye than the magnet, because several cases have been reported where even the large fixed magnet has failed to reveal the presence of the foreign body in the eye.

THE RATIONAL TREATMENT OF ABORTION IN COUNTRY PRACTICE.

BY J. W. CLINE, M. D., GEORGETOWN, COLO.

In country practice we do not have at hand all of the conveniences that are supplied to the city practitioners. When confronted with a difficult operation we can not step to the telephone and call an ambulance to transport our patient to a modern hospital, where there is at command all of the equipment and assistance that science can afford; more apt are we to be over the hills and far away at some little hut on the mountain side, where we are not only called upon to be physician, but often times must assume the responsibility of being our own anæsthetizer, exercise the duties of nurse, and possibly that of porter as well. It is here in the midst, as is so often the case, of uncleanly surroundings, and with a scarcity of even the essentials, in cases such as we have under discussion, that we must say, with Michael Angelo, "If we can not realize our ideal, we must at least idealize our real."

By the term abortion, I mean the expulsion of the products of conception before the fetus is viable (Parvin), and I wish to speak especially of that stage of abortion, sometimes termed fetal abortion, which occurs between the tenth week and the end of the fifth month.

When abortion takes place during the first few weeks of pregnancy and the products of conception are expelled entire, the treatment is simple:—simply rest in bed for a few days with vaginal antiseptic douches is all that is usually required. Later than this, or whenever any portion of the membranes or decidua remains within the uterine cavity, more active treatment is required. Any portion of the conception, whether it be membranes, placenta or decidua, after being cut off from its blood supply, becomes dead flesh, a foreign matter; and if not extracted, is the rendezvous for septic infection.

We will suppose that we are called, perhaps several miles from our town, to see a case, the exact nature of which we probably do not know. On our arrival we find, however, a woman three or four months pregnant, suffering from a threatened abortion; and on examination we find that the abortion is inevitable; she is flowing, perhaps profusely, and has occasional attacks of syncope. The question immediately arises, with such a condition, and under such circumstances, what is the best treatment for us to pursue? The books tell us that in order to stop the hemorrhage it is best to hastily clean out the uterus, and in order to do this Lusk advises the use of the fingers or hand, and adds that if the vagina is thoroughly disinfected, and the hands are surgically clean, the operation is absolutely devoid of danger. I have never yet seen a woman die from hemorrhage in case of abortion, but I have seen them die from infection, and infection I regard as "*maximum periculum*" against which we must guard in the treatment of these cases. Not long since, a physician who commands a large practice told me how he was called to a case such as just described, and that, after driving several miles, upon reaching his destination he hurried into the house and found his patient suffering such a profuse hemorrhage that he pulled off his gloves, and, not stopping to wash his hands in any way whatever, immediately thrust them into the womb and delivered it of its contents. I do not believe that haste is ever

as imperative, nor the advantages gained in this mode of treatment as great, as to warrant such reckless disregard of the use of antiseptics.

The treatment that I pursue in my rural practice is as follows: Given such a case, three or five months pregnant, the abortion inevitable, hemorrhage profuse and possibly occasional spells of syncope, the patient is given a drachm of the fluid extract of ergot, and possibly a hypodermic injection of 1-20 grain of sulphate of strychnia. She is then lifted and placed crosswise of bed, buttocks brought to the edge with Kelley pad placed beneath, thighs and legs flexed and feet placed on chairs that are stood beside the bed. The thighs are well separated and the pudenda washed with soap and water and strong bichloride solution. A bivalve speculum is now introduced, and the vagina freed of all clots and any of the products of conception that may be retained therein. It is then thoroughly swabbed out with soap and water, followed by swabbing and douching with 1-2000 bichloride of mercury solution. Having gotten the vagina and cervix as thoroughly disinfected as possible, the vagina is now packed with strips of iodoform gauze, first in and about the cervix, and then by filling well the vagina. The patient is now replaced in bed, ordered to have an occasional dose of ergot, and she can be safely left until the following day—twelve to fifteen hours—before any further steps are taken.

This mode of treatment offers three distinct advantages: First, if the cervix is not sufficiently dilated to allow the uterine contents to be extricated the tampon serves to stimulate contractions, at the same time retaining clots and such of the products of conception as may be forced down into the cervix, and which tend to dilate the latter, thus avoiding any forcible or instrumental dilatation which always results in more or less injury to the soft parts and gives foci for septic absorption. In the second place, should the patient have suffered a great loss of blood, it prevents any further loss and allows her time to strengthen before the more serious and painful operation of cleaning the uterus is performed. Third, and most important of all, is the fact that it gives the operator time to properly prepare solutions, sterilized instruments, and such apparatus as is necessary in the scientific treatment of cases of this kind, and

by so doing he avoids the chance of introducing anything into the womb that is not thoroughly aseptic.

At my office, and before visiting patient again, I have prepared a normal salt solution and a 1-8000 bichloride of mercury solution; these are put into sterilized, one quart fountain syringes. If the combination hot-water bag and fountain syringe is used, and the water put in while very hot, it may be placed in your grip, and carried several miles, even in cold weather, and will be sufficiently warm for use when you reach your destination. Instruments are boiled, wrapped in sterilized towels, and placed in your grip with such other apparatus as is necessary. On visiting the patient, she is once more placed in the dorsal position as formerly described, a bivalve speculum introduced, packing removed, and the vagina again thoroughly cleansed. The anterior lip of the cervix is now seized with a volsella forceps, while with the placental forceps you remove whatever products of the conception you may find in the vault of the vagina and cervix. You will usually find that by this time the fetus and portions at least of the membranes and placenta, if yet formed, are lying in the mouth of the cervix, ready to be extracted with little or no trouble, and the cervix is found, almost without exception, to be softened and dilated, so that the womb can be entered without forcible dilation. After removing the loose portions that may be lying in the cervix, the placental forceps are introduced into the womb and as much as possible of the remaining portions are seized and pulled away; following this the placental curette is introduced and the remaining portions of the placenta and membranes are scraped out, after which a moderately sharp curette is used, and the whole of the interior of the womb is carefully but thoroughly curetted. This latter step is especially designed to insure the entire removal of the decidua. Among all of my instruments and apparatus, there is none that facilitates the performance of this work more than my four-inch head-mirror. If a lamp is held over the patient's abdomen, or, with daylight, if she is so placed that a window is directly in front of the accoucheur, all the light that can be desired can be easily reflected into the vagina. Having now finished the curetting, the womb is douched with the 1-8000 bichloride of mercury solution, then thoroughly swabbed with

Churchill's tincture of iodine, followed by a douching with normal salt solution. It is now lightly packed with strips of 5% iodoform gauze, a strip also placed in the vault of the vagina, and patient replaced in bed, given a drachm of ergot, and left for twenty-four hours when the uterus is again douched and a strip of gauze placed in the vault of the vagina. This is left for thirty-six hours, after which, especially if not convenient for the physician to see patient again, she is directed to remove it and have an antiseptic douche.

This treatment has required three visits on the part of the physician, and it is usually not imperative at least that he should at this time give the case any further attention.

In support of this mode of treatment we can offer several arguments. First, referring to Lusk's advice of the use of the hands, I wish to say that, at best, I consider the hand a very clumsy instrument with which to clean the uterus. Not only is its introduction through the vagina exceedingly painful and apt to do injury to the soft parts, but when the period of gestation is between three and five months the villi of the placenta lie so interwoven into the crypts of the decidua that with the use of the fingers it is impossible to do any better than to leave a ragged placental site, with portions of the placenta and decidua hanging to the uterine wall which must be sloughed off and become a hot bed for septic infection. By thoroughly curetting, not only the placenta but the decidua, as well, is thoroughly removed, so there is no unnourished tissue left behind. And, further, bacteriology tells us that it is practically almost impossible to completely disinfect the vagina; and though the hand may be ever so clean, yet, when it is forced up through the vaginal tract there is infinitely more danger of infecting the uterus than with the use of sterilized instruments.

In the detail of this treatment you will notice that I have said nothing about an anæsthetic—for the reason, however, that I very seldom find an anæsthetic necessary. Only in those cases where from neglect or other causes peritonitis or other forms of pelvic inflammation have set in, the parts are sometimes rendered so sensitive that an anæsthetic must be employed; but in the great majority of cases an anæsthetic is not only unnecessary, but where there has been any considerable amount of hemor-

rhage I consider, for several reasons which I will not enumerate, that the employment of an anæsthetic is entirely unjustifiable. Indeed, I have on more than one occasion, in the absence of sufficient or proper assistance, curetted the womb while the woman not only endured the operation, but at the same time retained a lamp by her side, with which I was enabled to see to operate. In regard to the results of this mode of treatment, I have but to say that where I was the first physician called to the case, I have, as yet, my first patient to lose in a case of abortion.

HELPS IN REFRACTION BY THE SUBJECTIVE METHODS OF EXAMINATION.

BY MELVILLE BLACK, M. D., DENVER.

A short time ago I urged that the general practitioner should equip himself to examine the eye for its errors of refraction[1]. It is now my purpose to throw out a few hints that may help the beginner in refraction to arrive at accurate findings.

It has been my endeavor as a teacher of refraction to inculcate into the minds of students the importance of mastering the mathematics of lenses in combination. It seems simple enough and really is simple, yet I find it most difficult for students to grasp. First let us add two lenses of the same sign: +1.00 spherical (S) combined with +1.00 S. = +2.00 S.. Now let us combine two lenses of different signs, thus: +1.00 S. combined with —1.00 S. = O; they neutralize each other. We repeat this example by combining +2.00 S. with —1.00 S., results +1.00 S. This is very simple and is not at all puzzling, and only becomes confusing when spherical and cylindrical lenses of different signs are combined—thus: +2.00 S. combined with —1.00 Cyl. ax. 180

[1] "Some Reasons Why the Eye Should Receive More Attention at the Hands of the General Practitioner."—Colorado Medical Journal, December, 1899.

= + 1.00 S. combined with + 1.00 Cyl. ax. 90°. The cylinder, being concave, neutralizes a portion of one meridian of the convex sphere. If the student will remember that a cylinder is a lens whose refracting surface is at right angles to its axis, and that the lens parallel to the axis is a plane surface, he will place himself in position to understand that the surface of the lens having no curvature can not influence a lens combined with it any more than could a piece of window glass. That portion of the cylinder having curvature will influence a lens combined with it in accordance with the signs of the two combined lenses. If both are of the plus or minus sign it becomes a problem of simple addition. If one is plus and the other minus it is a problem then of simple subtraction. Thus, combine a + 1.00 S. with a — 1.00 Cyl. ax. 180°, the cylinder in the direction of its axis will in no way influence the sphere, but the cylinder in the meridian at right angles to the axis will subtract from the sphere and neutralize it, as both are of different signs and of the same refractive power. The spherical lens will be neutralized in the vertical meridian, while its horizontal meridian will be unaffected and it becomes in effect a + 1.00 Cyl. ax. 90°.

A proposition still more difficult to understand is where a spherical is combined with a cylindrical lens having a different sign and of different refractive power. For example, + 2.00 S. combined with — 1.00 Cyl. ax. 180°. Here it will be observed that the cylinder neutralizes the vertical meridian of the sphere to the extent of one dioptric and that it does not affect the horizontal meridian. The refracting power of the resulting lens is + 2.00 in the horizontal and + 1.00 in the vertical. Such a lens can only be a sphero-cylinder. To determine the strength of the sphere and the cylinder let the refraction of the lesser meridian represent the sphere, then subtract this meridian from the meridian of greater refraction, and the difference will represent the strength of the cylinder, the axis of which should be placed in the direction of the meridian of lesser refraction—thus: 2 — 1 = 1. We would then have in combination + 1.00 S. combined with + 1.00 Cyl. ax. 90°, instead of + 2.00 S. combined with — 1.00 Cyl. ax. 180°.

The most difficult proposition of all to understand is the conversion of a crossed cylinder into a sphero-cylinder. For ex-

ample, to convert a + 1.00 Cyl. ax. 90° combined with — 1.00 Cyl. ax. 180° into a sphero-cylinder we can use a + 1.00 S. combined with — 2.00 Cyl. ax. 180°. Remember that with our crossed cylinders the plus cylinder has its axis at 90 and its greatest refractive power at 180°, and that the minus cylinder has its greatest refractive power at 90°, i. e., the greatest refractive power of each cylinder is at right angles to its axis. You will observe that the — 2.00 Cyl. ax. 180° completely neutralizes the + 1.00 S. in the vertical, and that — 1.00 still remains active in this meridian while the + 1.00 S. in the horizontal remains unaffected, hence the + 1.00 S. combined with — 2.00 Cyl. ax. 180° gives the refractive power equivalent to the crossed cylinders + 1.00 Cyl. ax. 90° combined with — 1.00 Cyl. ax. 180°. This is confusing because it is necessary to remember that the axis of the cylinder is at right angles to the meridian of greatest refraction. The importance of being thoroughly familiar with lenses in combination is that in testing the refraction of the eye much time may be saved and more accurate answers obtained from the patient, if the lens in the trial frame before the eye under examination is added to or subtracted from by placing another lens in front of it. If the time is taken to remove the lens in the trial frame and replace it by another of lesser or greater strength, the patient is unable to compare the results of the two as accurately as if the lens representing the change desired were rapidly combined with the lens in position and then withdrawn.

In an eye requiring sphero-cylindrical correction, it is possible to obtain fairly good vision with too strong a sphere combined with too weak a cylinder, or vice versa, and so long as the strength of the sphere or the cylinder is changed separately the condition will not be improved, but by adding to the cylinder and subtracting from the sphere at the same time the patient is at once aware of the improvement in vision. For example, we have vision = 5/5 W. + 2.00 S. combined with + 1.00 Cyl. ax. 90°. By placing a — 0.25 Cyl. over the above combination with its axis at right angles to the axis of the cylinder in position, we at once change the combination to + 1.75 S. combined with + 1.25 Cyl. ax. 90°. The same rule holds good when working with concave lenses. I have found it possible by this method to bring the vision up very decidedly, and to feel that my findings were accurate.

A point that I believe most essential is that the refraction of the two eyes be equally well corrected. If the detection of one-quarter of a dioptric of error in one eye is overlooked and the other eye is correctly refracted it is infinitely worse than had the same error been made with each eye. After correcting the refraction of each eye it is my custom to compare the vision of each with the other, and if the vision of one eye is found to be lower than that of its fellow I again resume work upon it, and see if it is possible to improve its vision by making slight changes in the correcting lenses in the manner described. The vision of both eyes is again compared, and often it is found that the better eye before is now the poorer of the two. This eye is now taken in hand and the case not dismissed until the vision of the two eyes is pronounced the same. The comparison test is valuable in case the patient is unable to judge if a further change in lenses improves the vision when one eye is being tested alone. If this eye is found to be lower in vision than its fellow he will be able to tell when the vision is raised to a point equal with its fellow. The comparison test is only of value when the vision of each eye has been raised singly to the highest point possible. Some people do not have the same acuity of vision in both eyes, and this may mislead for a time when using the comparison test. It should never be judged, however, that there is a difference in the visual acuity until every effort to improve the vision of the poorer eye has failed.

One thorough test under atropine or homatropine is worth a dozen made without it. When for some reason a cycloplegic can not be used, it is usually possible to come nearer to the proper correction by testing both eyes together after having finished each singly. No matter what the correction singly is found to be, place a + 0.25 S. over each eye in front of the lenses already accepted, and continue to increase the strength of the sphere a quarter of a dioptric at a time until the vision begins to blur. Then use the comparison test until the vision of the eyes is the same.

It will be observed that to conduct any of the above tests it is essential that the operator be familiar with the combination of lenses, otherwise he will have no idea of what he is doing.

Another point to be remembered is that the distance at which we place the card from the patient is not infinity, hence

the rays from the test card to the eye under examination are divergent. If the eye being examined is not under the influence of a cyclopegic, and it is not myopic, it must make an accommodative effort to focus these divergent rays. For example, the patient is seated five meters, or two hundred inches, distant from the test card. It will therefore require a plus lens of 200 inches focal distance, or + 0.20 S., placed in front of the patient's eye to render parallel the divergent rays from the test card. If the eye is emmetropic these divergent rays now rendered parallel will focus upon its retina without any accommodative effort. An eye myopic to the extent of 0.20 D. will focus these divergent rays with its accommodation inactive. It becomes apparent then that in estimating the refraction of the eye whose accommodation is paralyzed, the rays of light coming from the test card must be rendered parallel; that the lens required to render them parallel must be deducted from the lens found to correct its refraction at infinity; that five meters is not infinity, and that to make it equivalent to infinity a + 0.20 spherical lens is required, which in turn must be deducted from the lenses found to correct the error of refraction. A hypermetropic eye with its accommodation paralyzed requiring at five meters + 1.25 S. for the best vision will be overcorrected for infinity to the extent of + 0.20 S. [2] A myopic eye under the same conditions will be undercorrected to the extent of a quarter of a dioptric, hence with accommodation paralyzed it becomes necessary to deduct a quarter of a dioptric from the lens required to correct the error of refraction in hypermetropic eyes and to add a quarter of a dioptric to the correcting lens of a myopic eye. With me this rule is not applied to myopic eyes, as I desire just this amount of undercorrection. This rule may seem a little confusing when applied to cases of simple hypermetropic astigmatism. For example, an eye with its accommodation paralyzed requires + 1.00 Cyl. ax. 90° for the most distinct vision at five meters. This eye is one-quarter dioptric myopic or it would not accept such a

[2]The actual overcorrection is + 0.20 D., but, since a lens of this strength is not commonly in use, we will therefore speak of the overcorrection as + 0.25 D., i. e., hence a quarter of a dioptric plus lens is the strength of lens required to render parallel the rays of light coming from a test card five meters distant.

lens, hence it becomes necessary to prescribe — 0.25 S. combined with + 1.00 Cyl. ax. 90°. Again, suppose the above eye accepted + 0.25 Cyl. ax. 90°; the same rule would apply, and we would prescribe — 0.25 Cyl. ax. 180°. The above rule does not apply to eyes under the influence of a cycloplegic. When the accommodation is active there is no danger of overcorrection in hypermetropia and too much danger in myopia.

DISCUSSION.

Dr. Edward Jackson: Mr. President, Dr. Black somewhat apologized for the nature of his paper; and yet perhaps one of the chief guides, in fact, would be to illustrate the difference between the measurement of refraction and the problems that have to be dealt with in the ordinary practice of medicine in most other branches. I think that those who have not given any attention to this subject rarely realize that, but if you are in a position to follow Dr. Black's thought through an unfamiliar language—an unfamiliar way of stating things—you realized perhaps that there was a field here that was quite apart from that of ordinary practice, while yet closely related to it.

One other thought about the mastering of these problems for the student, or the practitioner, and that is the importance of rendering the problem as fair as possible. That is, if you read or are taught that a certain lens does a certain thing, get the lens and see that it does; that is, take the lens and get the point of light that would give you the center of rays, and then with the card screen to represent the retina see what the lens does to the pencil of light passing through it. There is elaborate apparatus for this purpose, but it is not necessary to have the lenses in a dark room; and perhaps if you smoke, and partially fill the room with smoke so you can trace the pencil of rays across the room, you can get the best demonstration of all these problems.

In reference to Dr. Stevens' paper I have to say this, that it is an extremely important paper opening up a new field. The bringing of these observations—which have not yet been confirmed by enough observers to make them entirely certain and

definite—yet into immediate relation with the different errors of refraction, and the other painful conditions about the eye that are liable to be associated with headache, is an extremely important matter. It is one that I confess I am not competent to discuss even, in the way of reaching any conclusions, but I can say that it is very important, and I am thoroughly convinced that while these areas may not be so definite as a description necessarily makes them, and may not be so constant, there are factors which probably obliterate them in certain cases that we are not familiar with. I can conceive that a careful study will yield very important results.

THE INFLUENCE OF MYTH AND SUPERSTITION ON MEDICINE.

BY W. W. REED, M. D., FOWLER, COLO.

As this paper does not deal with a medical subject proper I may perhaps be a trespasser on your valuable time in presenting it. But as it does deal with one of the by-paths of medicine, and one that in its many phases is so often met with by every physician, I entertain the hope that you may be interested in the ideas herein presented.

That many remnants of ancient myth, legend and superstition still linger with our generation we see almost daily some evidence, but in no line of thought has superstition become so engrafted upon the mind or been such a stumbling block to progress as it has in that of medical science. We meet so many absurd and ridiculous ideas regarding disease and medicine in general in persons of otherwise superior intellect, that we are often not only surprised and disappointed but thoroughly disgusted. There are few country neighborhoods but have still some believers in the healing powers of the seventh son of the seventh son. We are greatly favored in our neighborhood in hav-

ing two or three persons who can check any hemorrhage of either man or beast by repeating from memory a certain verse of a certain chapter of the Bible. I have been promised the reference to the magic verse but as yet have not obtained it, so am not able at present to communicate to you this very desirable accomplishment. Babies are still everywhere weaned when the sun is right. While treating a perforating wound of the chest not long since I was asked not less than half a dozen times if I had drawn a silk handkerchief through the wound.

We meet with evidences of the effect of superstition from national down to county and municipal legislation. We encounter it at the bedside of our patients, arrayed in all of its ancient mysticism. We saw it cropping out at all sides in the fate of our late state medical practice bill. An attorney general of the great and enlightened state of Kansas in a recent opinion strongly illustrates its hold upon the lay mind. He says, regarding the enforcement of the medical practice laws of that state, that magnetic healers, hypnotists, and all other quacks can be prosecuted, but that divine healers claim to get their power from Jehovah and that, as he understands it, the rights and privileges of Jehovah can in no way be regulated or restricted by the statutes of the state of Kansas. And so illustrations might be multiplied ad infinitum et nauseam.

The idea to which I desire more particularly to direct attention is this: Why does this state of affairs exist? Is there any reasonable or sensible explanation why a man who in the conduct of his social, financial, political, and religious affairs uses the utmost sagacity and intelligence, when it comes to matters of disease in his own family or that of his friends often is satisfied with nothing that resembles good sound reason and common sense, but must have something outside the domain of practical medical science—something supernatural?

In searching for an explanation of this question I have formed some ideas and drawn some conclusions that to my own mind at least offer a partial solution. During the earliest history of the human race primitive man was brought into intimate contact with nature in all her various and fanciful moods. He observed first of all earth, sea, and sky, with the principal orbs of heaven—the sun, moon, and stars; and the attributes and ef-

fects of these bodies—light and heat, twilight and dawn. He also observed the clouds floating overhead, and the bubbling fountains and running brooks beneath his feet. The powerful but unseen wind, the vivid lightning flash, and the deep roll of thunder, shaking both heaven and earth, filled him with feelings of the greatest veneration and awe. Of these wonderful and awe-inspiring phenomena of nature observed for the first time, what explanation?

The recurring phenomena of day and night began to stir his imagination. The miracle of the dawn stealing silently out of the bosom of the night, the splendor of the noonday with its contests between sun and cloud, the sinking of the sun behind the western hills, the splendor of the afterglow fading slowly into darkness, were all phenomena of the phases of nature that sank deeply into the consciousness of the race, and to it all the imagination responded with a prolific growth of poetic description. In these poetic outbursts these phenomena were explained by imputing personality to inanimate things. All nature, to their vivid imagination, was alive with invisible beings, and everything from sun and sea to the smallest fountain and rivulet was under the control of some particular divinity.

Thus the thunder storm, which to us suggests certain electrical and atmospheric conditions, was by him pictured out to be a huge dragon at which the heavenly archer was directing his swiftly flashing arrows. The phenomena of twilight and dawn were explained by the story that Eos, the Goddess of the Dawn, dwelt in a palace on the east side of the earth, from whence every morning she came forth in her yellow chariot drawn by four brilliant white steeds before her brother, the Sun, and drove through the sky shedding light abroad until in the evening she sank in the west before him, whence they traveled together during the night to the east again.

They were not so far off from the truth in the story of Apollo and Python in explaining the origin and effects of our plasmodium of malaria. Python, a monster serpent, was born of slime and stagnant waters from the deluge, and had long terrorized the inhabitants by making great havoc among their numbers. None had dared to approach the monster, but at last Apollo the Sun went boldly forth, met, and, after a desperate conflict, slew this

demon with his golden shafts. So we see that when primitive man endeavored to explain what he saw about him, instead of framing a scientific theory as we should now do he created a myth. The extent to which this process of myth making was carried by the people of the successive ages of the world's history is a marvelous study within itself.

The complicated systems of the Greek, Roman, and other mythologies are more or less familiar to all; and that medicine and disease furnished in them all a fertile field for its growth and culture may well be imagined. Aesculapius, the Greek god of healing, as you know, was the son of Apollo, the god of the sun, and Coronis, the goddess of the dawn; but Aesculapius presuming to call the dead to life was slain by the god of gods, Jupiter, a sad warning, says McCully, to all modern physicians who feel themselves competent to conquer the Silent Messenger.

I refer to this subject of mythology to show that the myths have a claim on our attention. They are not to be regarded as mere idle nursery tales, but by tracing out their origin and hidden meaning they yield up principles of the greatest value to the philosophic historian who would thoroughly comprehend the mental development of the race. They are to be regarded as the beginnings of all natural science as we have it to-day—the first effort of the human mind to interpret nature, the first step in the acquisition of classified knowledge, the first perception of the relation of cause to effect.

To undertake to trace the successive stages of mental advancement through the centuries from the myth down to our time would be a task too stupendous for this paper, but that it has been gradual and progressive we have complete and sufficient evidence, until now, before hypothesis, theory, or conclusion will be accepted by the scientific world, it must be first subjected to the crucial test of rational observation and good practical common sense.

That this is true of science in general—physics, astronomy, geology, chemistry, etc.—all will readily admit, but that it is true in regard to medicine, only in a very limited extent, all must also admit.

The advancement of medicine as a science in the lay mind and that of some physicians has been greatly hindered, more so

perhaps than that of any other science. This is largely due, I think, to the fact that medicine in its very incipiency had the misfortune to fall into the hands of an order of the priesthood, the Aesclepiadae, who used it largely as a means to work upon the credulity of the people. By a great show of charms, mysterious rites, and superstitious ceremonies they maneuvered in such a manner to impress the human mind that, although many centuries have now elapsed since Hypocrates rescued the sceptre of medicine from the priesthood, they have left an influence upon the science and art of medicine so strong that it will probably be many centuries yet before its effects will be entirely eradicated. Hence we see superstition, at a time in the world's history when it was most prosperous, became wedded, as it were, to the science of medicine, and as a result of this union we have an inherited tendency of great antiquity that is hard to shake off. The most enlightened people of our day are sometimes so affected by this inheritance from an ancestry who were ignorant and therefore superstitious, that in spite of education and enlightenment they suffer themselves to be influenced by it.

If there is anything on this earth about which people are superstitious they are sure to be so about medicine and the cure of disease. An unseen agency is at work before their very eyes. They see the effect—friends sicken and die; but the power remains unseen and therefore some mystery must be there, some supernatural agency at work within. This is a natural conclusion of the human mind in dealing with such a proposition.

As medical men I think we often make the mistake of expecting too much of people in these matters regarding which the masses still remain in a very uncertain mental state. We see so often incredulity and superstition where we naturally expect intelligence and common sense that we get out of patience and are led to strongly disclaim against it. But this is no cure for the ill. Education is the remedy, and if people are ever to get above the mists of superstition they must be raised by education. Again, we often err, I think, in closing from them, in disgust, the only source from which this education ought to come. Only educated, honest men are competent to instruct. Yet as a matter of fact it is too often true that the superabundant literature of the advertising charlatan and quack is the sole standard of

authority of the public in regard to physicians, medicine, and disease.

There is no sensible reason why people should be permitted to think that there is the least thing secret, mysterious, or supernatural connected with medicine or disease. We do not deal with the supernatural, the invisible, nor the mysterious, but with the natural, the visible, and the practical, when seen with scientific and rational eyes. That medicine is as much an exact science as physics, astronomy, geology, or any of the so-called sciences I firmly believe, our much learned governor to the contrary notwithstanding.

A branch of learning, as I take it, to be entitled to be called a science must have its foundation built upon laws of nature or principles that are firmly established. In the practice of medicine I am aware that first, last, and all the time we are dealing with a force the nature of which is beyond our knowledge, viz., the vital force, but cannot the same be said of the phenomena of heat, light, and electricity? And yet we formulate principles and laws of their action, and reason on the several processes and call that scientific. We know quite as fully of the laws and processes that govern the action of the vital force, and in these facts why may we not find the foundation for the science of medicine? We cannot but admit the truth that there was a time when medicine had no established principles on which to rest and its practice was consequently very largely that of pure empericism, but cannot very much the same thing be said of the early history of all science?

The stigma that medicine is not an exact science will no longer apply to our profession and should be in every and all instances confuted. Our science sees in the laws governing the conduct of the vital force a process as uniform and unvaried as the Creator himself. It sees the cell as the prime origin from which all life starts, and in its changes, folding, unfolding, expanding, development and growth, it sees repeated with unerring uniformity the story of its progenitors. It sees the cells combine to form tissues, and tissues combine to form organs, and organs working in harmony to complete the perfect individual possessing the grand possibilities of a spiritual life that reaches onward and upward to the Infinite. Our science further tells us that so

long as cell, tissue, and organ perform their natural function properly and preserve their mutual harmony of action there is a state of health and well-being in the individual. But, alas, we also learn from our science that there are other possibilities wrapped up within this same life force, that when this mutual function is disturbed, and this harmony of action destroyed, then the tendency is toward disease and death.

This suggests to the mind the oft-repeated question of disease. What is it? The absurd idea of the ancients that it was an entity—something that entered the body and set up a disturbance and had to be driven out by charms, secret potions, or by some supernatural agency—we had just about outgrown when along must come the modern vagaries, equally absurd, that all disease is simply a mortal delusion of an immortal mind, that it must be cured by divine agency, supernatural laying on of hands, by magnetic power, by the lifting of ribs, and pulling of legs, of its credulous victims. Many of these modern fallacies have for their basis a religious idea, and endeavor to supplant material treatment by a spiritual agency. Some of the people advocating these ideas are honest in their beliefs, and it should therefore be our aim to educate and enlighten them. Harsh criticism will do more to upbuild their numbers, convince people of the animosity of physicians, and give them cause to pose as martyrs than any other course. We should rather endeavor to show the principles upon which their claims rest—meet them on grounds of common sense, and review the matter from a practical scientific standpoint.

It is well known to all intelligent physicians that if for any reason the organs of the body, either individually or combined, fail to functionate properly, if normal nutrition is disturbed by either internal or external, bacteriological, chemical, mechanical, or toxic cause, we have disease. A positive definition of disease cannot be given. Both health and disease are relative terms, one is the direct antithesis of the other. Physiology acquaints us with the essential conditions of the one, pathology describes to us the changes that occur in the other. Health is a physiological process which tends to perfection and life, disease is a pathological process tending to destruction and death.

Educated physicians do not now believe that medicines cure disease, and only in a very limited extent is it believed that medicine antagonizes any of the many pathological conditions that so frequently exist. But it is pre-eminently considered to be the province and effort of the physician to discover and remove the acting cause of the diseased condition, and to apply such measures, medicinal or dietetic, as will best assist nature in guiding back the disturbed organs into their normal condition.

The physician who knows his physiology, anatomy, histology, and pathology, has laws and principles at his command that enable him to employ, if he uses good judgment, strictly scientific means in his therapeutic measures for the relief of disease. It is not uncertainty nor guess work with him, but he advises along the line of well-known laws and prescribes in the light of accepted principles. It is as true in medicine as in all other sciences that in delving deeply we get often beyond the depths of human comprehension and catch frequent glimpses of the infinite. The finite can never expect to reach the infinite, nor the human to fathom the divine; yet in the light of true science we can with certainty hope to differentiate the natural from the supernatural, and to rise above and beyond the level of myth and superstition.

BIBLIOGRAPHY.

Ridpath's History of the World, Vol. II. Greek Superstition.

Bullfinche's Age of Fable.

McCully's Reprint on Myth and Medicine.

Maybie's Nature and Nature Culture.

King, Country Doctor.

Keightly's Mythology.

Pettigrew's Medical Superstition.

Dunglison's History of Medicine.

Herrick's Have We in Nature a Basis for a Science and Art of Medicine?

THE DIAGNOSTIC AND THERAPEUTIC VALUE OF INSUFFLATION OF THE OESOPHAGUS, STOMACH AND COLON.

BY C. D. SPIVAK, M. D., DENVER, COLO.

By the term "insufflation" we understand the filling of any cavity of the body with air, gas, or vapor for diagnostic or therapeutic purposes. One would expect that insufflation should have been applied first to either the oesophagus or colon, being as they are the two most accessible portions of the alimentary tract. Yet this is not the case. The anatomical situation of an organ has, evidently, little influence upon the march of its diagnostic or therapeutic progress. It was the stomach that received the first blast of wind, and, therefore, we will accord this organ the place of honor in our consideration of the subject.

INSUFFLATION OF THE STOMACH.

Methods. Insufflation of the stomach, or, as it is otherwise known, ballooning of the stomach, was used for the last three decades as an aid in diagnosis in diseases of the intraabdominal viscera in general and the stomach in particular. Frerichs (1) and Fenwick (2), independently of one another, introduced the method of insufflating the stomach with carbonic acid gas. They gave their patients on an empty stomach a glass of seltzer or an effervescent powder. Wagner (3) has evolved the method now in vogue, namely, to give the patient a solution of bi-carbonate of soda, followed by a solution of tartaric acid. The dose as originally recommended by Wagner was "as much as will go on the edge of a knife." Riegel (4), Ziemssen (5) and Ebstein (6) increased the dose of each ingredient to one teaspoonful. Runeberg (7) substituted atmospheric air for carbonic acid gas. The air is pumped into the stomach from a double-bulb spray apparatus attached to the stomach tube. Rouveret (8) and Fürbringer (9) substituted the lungs for the spray apparatus. The expired air of the lungs is blown by the mouth into the stomach through

a tube. I have devised a method (10) by which the patient himself is enabled to insufflate his own stomach.

My method is based upon the following physiologic fact: When the stomach-tube is in place, it in no way interferes with respiration or vocalization. The patient is able to take a deep breath, sing a tune, blow a horn and inflate a bag. Why should not the patient blow up his own stomach? The simplest procedure which presented itself to my mind was to bend the free end of the tube, introduce it into the mouth of the patient, and order the patient to blow away. The patient upon whom I tried this method happened to have been blessed with a wide oral orifice guarded by thick lips, so that he managed to hold in his mouth the doubled-up tube and blow his stomach up full, without the air escaping between the lips and tubes. This method, however, proved a complete failure in my next patient, who chanced to be a lady with a mouth similar to one described in Solomon's Song of Songs, but with lips which refused to hug and compress the tube. The good lady blew a good deal of breeze into my face, but not into her stomach. In order to afford an equal chance to one with superfluity of lip as to the one who is blessed with but a moiety of this article, I devised the following: I bored a side-opening in the tube at such a distance from the proximal end that when the tube is introduced into the stomach the opening should be situated in the anterior portion of the buccal cavity. I then clamp the free end of the tube, and ask my patient to shut his lips and teeth and blow up his cheeks. The air in the mouth, having no other exit, finds its way through the side opening into the stomach. The patient is told, as a matter of course, to breathe through the nose between the acts of blowing up the cheeks, and to keep the mouth shut until the end of the examination; otherwise the air will escape from the stomach through the side-opening. During the act of blowing up one's cheeks the tongue is retracted, the cheeks expand, and space is thus created for the filling up of a quantity of air. On the contrary, during the period of breathing through the nose, the mouth being shut and the cheeks pressed to the teeth, the anterior portion of the buccal cavity represents an almost air-tight cavity, and therefore the air in the stomach can not escape through the opening into the mouth.

Diagnostic Value of Insufflation of the Stomach. No matter what method is used, as soon as a sufficient quantity of carbonic acid gas or air is introduced into the stomach, the patient being in a horizontal position and on his back, the organ becomes distended, so that it stands out prominently upon the abdominal wall and is evident as a sharply defined arched elevation. The greater curvature is always well defined by inspection. We have to note the rapidity with which the stomach fills up, the amount of air used, the size, shape and position of the distended viscus, and the displacement, appearance or disappearance of tumors.

The Capacity of the Stomach. The capacity of the stomach can be measured by the quantity of air which the stomach can hold without causing any discomfort to the patient. Jaworski (11), Kelling (12), Ost (13) and Hemmeter (14) have each devised a method for measuring the quantity of air, either before it is introduced into the stomach or after it is expelled from it. Their methods are ingenious, but, notwithstanding their complicated construction, none give precise results. For clinical purposes we can measure the air introduced more or less accurately by using a pump whose cylinder has a known capacity. I use a bicycle hand pump which holds about 50cc of air. A normal stomach will tolerate from 1500cc to 2000cc.

Size of the Stomach. The degree to which the stomach can be distended without causing any painful sensations is very limited. If, therefore, the distended viscus is shown by inspection, percussion, and palpation to occupy an area larger than its anatomical relations warrant, it is tolerably certain that the stomach is dilated. And conversely, if the area occupied is too small, the stomach is diminished in size (contracted stomach), or it is dislocated.

Location of the Stomach. The stomach may be displaced upwards, downwards, or laterally. The upward displacement is usually to be found in cases where the intestines or colon or both are filled with gas and therefore insufflation of the stomach is impossible. The downward displacement of the stomach *in toto* must be distinguished from dilatation. The former is diagnosed when on insufflation the lesser curvature is located somewhere below the ensiform process. The rare condition of vertical displacement of the stomach can be recognized by the

fact that there is no bulging in the epigastric region after the organ is inflated. On percussion, the upper limit of the fundus of the stomach will be found in its normal position. "The line of the greater curvature runs to the left, emerges from under the ribs near the cartilage of the tenth rib or a little higher, and ends at the pylorus. The lesser curvature is displaced downward and to the left and is located by inspection, palpation and percussion along the border of the left lobe of the liver. In the median line of the epigastrium only the left lobe of the liver and the pancreas are interposed between the anterior abdominal wall and the spinal column. The aorta can here be easily felt and its pulsation is often visible." (15)

Patency of the Gastric Orifices. As soon as air or gas is introduced into the stomach, the pyloric orifice becomes contracted. In the conditions known as insufficiency or incontinence of the pylorus, the stomach will either become distended very slowly, or not at all. Since the pyloric orifice, when the stomach is empty, is in a relaxed state, and therefore a portion of the air may escape into the intestines without the presence of insufficiency, it is advisable that the distention of the stomach should be made after a test-breakfast.

In insufficiency of the cardiac orifice I should be inclined to think that the stomach will not fill up readily, as the air will escape between the tube and the oesophagus.

Shape of the Stomach. If the distended stomach shows on inspection and percussion and palpation two distinct sacs with an intermediate constriction, it is diagnostic of the rare condition of bi-locular or hour-glass stomach.

Tumors. Minkowski (16) has elaborated the following rule: In all cases of intraabdominal tumors, when the stomach is insufflated the tumor will be displaced in the direction of the organ to which it belongs. Tumors of the liver are displaced upward and to the right; tumors of the spleen are displaced downward and to the left. Tumors of the colon and kidney are displaced downward. Tumors of the mesentery are displaced upward. Tumors of the pylorus are displaced downward and to the right. Tumors of the lesser curvature will be turned back and then disappear. Tumors of the pylorus may be revealed on insufflation. Tumors of the anterior wall of the stomach become

on insufflation less distinct, the margins less sharply defined, and they seem to diminsh in size. Tumors of the posterior wall get out of reach.

Adhesions. Adhesions can be made out on the same general principles referred to in the previous paragraphs.

INSUFFLATION OF THE COLON.

Methods. Von Ziemssen (17) was the first to recommend insufflation of the colon for diagnostic purposes. He injected into the rectum the acid and alkali solution mentioned above. Later he modified his original method by introducing the solutions through a rectal tube to which a funnel is attached. Schnetter (18) attaches a rectal tube to an inverted siphon containing soda water. When the valve is pressed the carbonic acid gas runs into the bowel without any admixture of water. Rosenbach (19) makes use of liquified carbon dioxid from a sparklet. Diffenbach uses Weissbier. Runeberg (7) recommends inflation with air by means of pump or spray apparatus. Fürbringer insufflates the colon by using his own lungs. At the VIII Congress für Innere Medizin, where the subject of insufflation of the colon was discussed, Fürbringer (20) stated that he inflates with his mouth, whereupon Mankopf arose and said "That is a matter of taste!" (Das ist Geschmackssache!) Damsch (21) has estimated that one liter of air is sufficient for inflation of the colon throughout its length. The amount, however, that the colon can hold is about 16 liters.

When the bowel is inflated with air or gas, the colon becomes evenly distended, and the ascending, transverse, and descending portions may be mapped out by percussion and palpation, and in thin persons they become visible.

DIAGNOSTIC VALUE OF INSUFFLATION OF THE COLON.

Location of the Colon. Normally the transverse colon is situated at or a little above the navel. When on insufflation the transverse colon is found below the navel, the diagnosis points to displacement, or enteroptosis.

Stenosis of the Colon. Stricture of the colon may be recognized when on inflation only the portion of the colon below the stenosis becomes distended. The air will escape outside between the rectum and the tube. The tympany below the stenosis is deeper or more sonorous. The patient may complain of pain after a sufficient quantity of air has been introduced, or if the pain has existed before it is now more severe. Occasionally one can hear at the constricted point a peculiar prolonged sound due to the stream of air forcing its way through the stenosis.

Dilatation of the Colon. Insufflation will reveal this condition, if the dilated portion is not within the pelvic cavity, by the methods above referred to.

Tumors. Minkowski's rule laid down in insufflation of the stomach holds good in the recognition of tumors when the bowel is insufflated, namely, that when the colon is insufflated the tumor will be shifted in the direction of the organ to which it belongs. Tumors of the stomach and liver are displaced upward; tumors of the gall bladder are displaced forward; tumors of the spleen are displaced upward and to the left; tumors of the kidneys are displaced upward and then disappear, and tumors of the mesentery are displaced upward.

Gastro-Colic Fistula. Gastro-colic fistula (22) may be recognized by the fact that when the colon is inflated the air will eventually distend also the stomach.

Perforation of the Bowel. Sutton (23) suggested the insufflation of ether into the bowel for the purpose of recognizing intestinal perforation. To a bottle filled with ether and provided with a perforated rubber cork, are attached two rubber tubes. One of the tubes is attached to a bicycle pump and the other to a rectal tube. The air pumped into the bottle becomes impregnated with ether. If there is a perforation in the bowel, the ether will escape into the abdominal cavity and fill it. If there is no perforation the ether will traverse the whole length of the intestinal tract, enter the stomach, and eventually be eructated, which can be recognized by the characteristic odor.

INSUFFLATION OF THE OESOPHAGUS.

In order to insufflate the stomach it is not at all necessary to introduce the tube right into the stomach. It is sufficient to introduce the tube into the oesophagus, two or three inches below the cricoid cartilage, and the pumped in air will find its way into the stomach. Hence if there is an obstruction in the oesophagus, due to a foreign body, growth, or stricture, the insufflated air will either not go into the stomach at all or will run in slowly. This procedure will indicate, therefore, the degree of the obstruction. Spasm of the oesophagus can more readily be diagnosed by insufflation than by the introduction of bougies. The passage of a bougie acts as an irritant, and increases as a rule the spasmodic contraction of the oesophagus, which is not the case when air is introduced. A diverticulum in the upper third of the oesophagus, which is the usual seat, can be recognized externally by inspection, for it will fill up with air and there will be present a tumor in the cervical region. Furthermore, by insufflation we may be enabled to make a differential diagnosis between diverticulum and dilatation of the oesophagus. In the latter the air will pass freely into the stomach, whereas in diverticulum the pouch will fill up with air and thus obstruct the lumen of the oesophagus. In a case under observation the air invariably forces the tube out of the oesophagus.

The subject of insufflation of the oesophagus has only recently occupied my attention. I have not yet had the opportunity of verifying all my theoretical reasonings upon an extensive clinical material. The few cases, however, in which I applied insufflation of the oesophagus as a means of diagnosis convinced me that there is a great deal yet to be learned from this method, and I hope to be able to report at a future date more definite conclusions, based upon clinical observations.

THERAPEUTIC VALUE OF INSUFFLATION OF THE INTESTINES, STOMACH AND OESOPHAGUS.

So far, insufflation of the colon has been recommended in obstruction of the bowel, especially in invagination and volvulus. Trastour (24) uses air, Von Ziemssen (17) uses carbonic acid

gas, and Senn (25) suggested hydrogen gas. The writer has noticed improvement in several cases of chronic atony of the bowels after daily insufflation of the colon. I am at present experimenting with insufflation of hot air into the stomach in various gastric disorders, but do not care to report premature conclusions. I would suggest that insufflation should be tried as a means of pushing down a foreign body lodged in the oesophagus. It is certainly less dangerous than the forcible use of an oesophageal bougie. I shall also use insufflation in my next case of oesophagismus.

BIBLIOGRAPHY.

1. Frerichs Riegel, Die Erkrankungen des Magens. Wien, 1896, p. 42.

2. Fenwick, The Morbid States of the Stomach and Duodenum, 1868.

3. Wagner, Inaugural Dissertation. Marburg, 1869.

4. Riegel. Die Erkrank. d. Magens, p. 42.

5. Ziemssen, Klinische Vorträge, 1888, No. 12.

6. Ebstein, Volk. Samm. Klin. Vortr., 1878, No. 155.

7. Runeberg, Deutsches Arch. der Klin. Med. XXXIV, p. 460.

8. Bouveret, Traitè des maladies de l'estomac, Paris, 1893.

9. Fürbringer, Deut. Med. Wochenschrift, 1899, No. 40, p. 606.

10. Spivak, Philadelphia Medical Journal (Special number on Gastric diseases), Feb. 3, 1900.

11. Jaworski, Deut. Arch. f. Klin. Med. XXXV, p. 83.

12. Kelling, Deutsche Med. Woch. 1892, No. 51.

13. Ost, Gesam. Abhand, aus d. Med. Klin. in Dorpat, 1893.

14. Hemmeter, Diseases of the Stomach, Philadelphia, P. Blakiston's Son & Co., 2d edition, 1900, p. 102.

15. Von Valzah and Nisbet, Diseases of the Stomach; Saunders, Philadelphia, 1898, p. 562.

16. Minkowski, Berl. Klin. Woch. 1888, No. 31.

17. Von Ziemssen, Deut. Arch. f. Klin. Med. 1883, XXXIII, p. 235.

18. Schnetter, Ibid, XXXIV, p. 638.

19. Rosenbach, Berliner Klin. Woch., 1889, No. 28.
20. Fürbringer, quoted in Gumprecht's Die Technik der speziellen Therapie Jena, 1900, p. 118.
21. Damsch, Berl. Klin. Woch., 1889, No. 15.
22. Rosemheim, Krankheiten des Darms, Wien, 1893, p. 445.
23. Sutton, Jour. Amer. Med. Association, Dec. 30, 1899.
24. Trastour, Bulletin Gen. de Therapie, 1874, p. 107.
25. Senn, Intestinal Surgery, 1899, p. 244.

HEADACHE DUE TO EYE-STRAIN, AND ITS TREATMENT.

BY E. W. STEVENS, M. D., DENVER, COLO.

An enormous literature has grown up around the subject of headache, reaching from the earliest times up to the present day. While the subject is an old one, with each step in advance in science old subjects are found to have new aspects. There is no ultimate knowledge, and things have as many characteristics as the observers have different points of view. In the elaborate monographs on headache written twenty years ago, as that of Day, eye-strain is not even mentioned as a cause of the affection; and now no investigation of a case of headache is considered complete without the refraction of the eyes and the balance of the ocular muscles having been considered.

The eye surgeon who notes the position of the headache in those who come to him with errors of refraction, soon comes to the conclusion that almost any part of the head may be affected. In the same way the general physician will find that affections of the stomach will be accompanied by headache in equally numerous situations. The locality of the pain therefore is not instructive. Mr. Henry Head, in a remarkable article entitled "On Disturbance of Sensation and the Pain of Visceral Disease,"[1] has

[1]Brain, Vol. 24.

pointed out that visceral disturbance not only produced pain at certain points on the surface of the body, but that this pain was accompanied by more or less definite areas of superficial tenderness. Mr. Head has shown that each organ in the head stands in relation with one or more areas on the surface, and to these areas pain is referred and over them the skin may become tender when the normal condition of that organ is disturbed. Such organs are the nose, the eye, the teeth, the tongue, the salivary and other glands, the tonsils, the larynx and, lastly, the brain itself. According to Mr. Head the locality of the pain is instructive only when we know the area of tenderness with which it is usually associated.

Mr. Head has moreover shown that herpetic eruptions on the head correspond fairly with the areas of tenderness produced by visceral disease, though not to as exact an extent as herpes on the trunk and abdomen correspond to sensitive areas produced by visceral disease. These sensitive areas do not correspond with the distribution of the sensory nerves, and he attempts to show that affections of thoracic and abdominal viscera not only produce pain and tenderness in the body, but also cause pain and tenderness over certain areas of the scalp. Whatever be the organ affected the headache and scalp tenderness will be in the same position, provided the tenderness on the body occupies the same areas. When an organ in the head, therefore, is disordered, the pain produced is frequently associated with superficial tenderness. Organs in the head behave in the same way as organs in the thorax and abdomen, and produce not only referred pain but also tenderness of the superficial structures in direct association with the referred pain. This tenderness, which is necessary to the full understanding of the locality of the pain, has been neglected, or at any rate dealt with in such fragmentary manner as to be useless.

The best method of testing superficial tenderness is by a blunt pin; this is felt as a blunt touch until the tender area is reached, when the patient complains either that the touch hurts and the skin is "tender" "like a bruise," or else he may say he is being pricked. If the tender area lies over the hairy scalp a useful method is to gently pull or lift the hair. This is perfectly painless in the normal human being, but becomes painful if

superficial tenderness is present over the scalp. Thus patients suffering from referred pain and tenderness will complain that their hair is sore when they brush it in the morning.

The area affected by disorders of the eye may be defined by a line starting in the region of the nose and following the lower margin of the bony orbit, thence running back from the orbital process of the frontal bone to the upper part of the insertion of the ear, and then dipping to form a curved line ending below the occipital protuberance. This area thus bounded may be again divided into smaller subdivisions, as:

Fronto-nasal—This area forms a racquet-shaped patch, with the larger part lying over the forehead. It extends for from two to two and one-half inches above the root of the nose, reaching the junction of the hairy scalp with the forehead and meeting its fellow of the opposite side, excepting just over the root of the nose. At the level of the eyebrows it extends out about one inch from the middle line of the forehead. A downward flap occupies the side of the nose, but does not reach the middle line, and ends below above the upper part of the ala nasi. The maximum point of this area lies over the orbital ridge of the frontal bone about one-half inch from the middle line of the forehead. The pain is said to be an aching over the middle of the forehead, and the patient points to the left or right of the middle lines over the supra-orbital notch. This area becomes tender in affections of the substance of the cornea, anterior chamber of the eye, upper part of the nose, and incisor teeth of the upper jaw.

The mid-orbital area consists of two portions separated from each other. The lower part is situated over the center of the eyebrow and involves the greater part of the upper lid. It sends a downward flap, which occupies the inner half of the lower lid. The second part of this area is situated over the extreme front of the hairy scalp, about two and one-half inches above the level of the root of the nose and exactly above the lower patch.

When this area is affected the pain is said to be at the back of the eye or over the middle of the eyebrow. The eyes are said to ache and at times the patient complains of soreness "over the front of the hair."

Tenderness in this area is usually due to an error of refraction. A healthy young woman, for example, finds she can not

sew without bringing on a headache. If asked to point to the position of the pain, she places the right hand over the forehead with the hypothenar eminence over the center of the right eyebrow, and the second phalanges of the four fingers over the left eyebrow; and this position of the hand has led to the common record in the case books that the patient has frontal headache. But the patient herself states that the headache is "over the eyes," and if asked to point with two hands to the position of the headache she will place the tips of the fingers over the center of each eyebrow. If we now examine the case by picking up the skin gently between the fingers and thumb, the patient winces as soon as a spot is reached about three-quarters of an inch from the middle line on either side. If now the blunt end of a pin is used, she complains that the spot is tender as soon as the area over the center of the eyebrow is reached. By either of these two methods the headache produced by eye-strain due to an error of refraction will be found to be associated with superficial tenderness over more or less of the mid-orbital area. It is the headache produced by disturbance of the normal action of the ciliary muscle, and for that reason is most commonly seen in hyperopia and hyperopic astigmatism.

Contrary to most statements upon the headaches of hyperopia and hyperopic astigmatism, my observation has taught me that it is a morning headache, coming on as soon as the eyes are opened; that it is then most intense, and gradually wears off during the day if the patient does not engage in near work. It is intensified by near work, as reading and sewing. On the other hand, headaches in myopia are entirely absent after a night's rest, excepting in that large group of myopes who habitually hold their work so near the eyes that it requires as great an effort of accommodation as a hyperopic eye would be required to exert. In progressive myopia the conditions are different. There is disease progressing at the back of the eye. Such patients commonly complain of pain "at the back of the eye." This pain is not associated with superficial tenderness and appears in many cases to be a local as opposed to a referred pain. Such patients sometimes complain of pain "on the top of the head," and there may be tenderness of the hairy scalp in this region. Now, as I mentioned before, many hyperopes complain of pain

"at the back of the eye." Thus there are two separate forms of pain, both of which are described by the patient in roughly the same terms—"aching at the back of the eyes." The pain associated with progressive myopia seems to be a local pain, while in hyperopia the pain is referred to the maximum spot of the mid-orbital area over the upper lid.

The same amount of effort which is painless with a strong ciliary muscle may become painful if the muscle is weakened by a deterioration of the general health. Many children will bear an error of + 3.00 D. without pain if in good health, while, on the other hand, many persons lose their headaches and the associated tenderness under a course of treatment directed toward the improvement of their general health. But while hyperopia and hyperopic astigmatism are peculiarly associated with tenderness over the mid-orbital area, there are at least two areas on the chest which are also associated with tenderness in this region. These chest areas are distinguished as the second and third dorsal regions, and lie roughly between the first and fourth ribs in front and over and just above the scapulae behind. In certain cardiac and pulmonary affections these dorsal areas become sensitive and are associated with headache and sensitiveness of the mid-orbital regions on the forehead, the patient complaining that reading and sewing are painful, although there is no error of refraction.

Regarding the location of the headaches and sensitive areas produced by imbalance of the ocular muscles, I can not speak with certainty at the present moment. Heterophoria being generally accompanied by refractive errors, the problem is a complicated one and requires the careful study of many cases before a solution can be reached. Most observers who have noted the referred pain of muscular imbalance have generally regarded it as occipital, but they have failed to note the area of tenderness which is necessary to a full understanding of the pain.

The following cases are reported as of interest in connection with the sensitive areas of muscular imbalance:

Mrs. W. L. W., aet. 35 years, referred to me by Dr. Nickerson, of Denver. Complains of severe pain in back of head and pain in eyes after using them for near work. Has had these pains since early childhood. Says scalp is tender when brush-

ing back hair. Three years ago uterus dilated and curetted and perineum repaired, with improvement in headaches, which lasted for about two months. Headaches then returned and have been getting progressively worse. Eyes had been examined several times. An examination of her eyes gave the following results: O. D. & O. S. $^4/_6$ 1 Esophoria 7 centrads. Anterior segments and fundi normal in all respects. Under atropin the refraction was found to be O. D. — 0.25 c, ax 150° = $^4/_4$ O. S. — 25 c, ax 30° = $^4/_4$.

The patient complained of pain in the eyes and pain in the back of the head. This pain was accompanied by superficial tenderness in the occipital region, the exact boundaries of which area I was unable to map out.

The following glass was ordered: O. D. — 0.25 S. combined with — 0.25 c, ax 150° = + 3 central prism base out; O. S. — 0.25 combined with — 0.25 c, ax 30° = 3 central prism base out.

The headaches and tenderness of the scalp rapidly passed away, and there has been no return during the past seven months.

Case II. Mr. A. F. B., aet. 24 years. Has pain in eyes and back of head, with dizziness, after using eyes for near work, which had compelled him to give up his course of study at the University of Nebraska. An examination gave the following result: Vision O. D. & O. S. $^4/_4$ +. Left hyperphoria 2 centrads. There was a well defined area of sensitiveness extending from just below the occipital protuberance to the vertex. The ophthalmoscopic examination showed normal eye-grounds, and the refraction under atropin was O.D.+ 0.25 S. = + 0.50 Cyl. ax. 90° = $^4/_3$ most O. S. + 0.25 S. = + 0.25 Cyl. ax. 90° = $^4/_3$ most. The following was ordered: O. D. + .50 Cyl. ax. 90°. A. S. + .25 Cyl. = 2 centrad prism base down. A week afterwards he was absolutely free from pain and tenderness.

Referred pain is not confined to disorders of the ciliary muscle and the extraocular muscles of the eye. All lesions of the eye from the substantia propria of the cornea back to the retina produce referred pain—that is, pain which is not felt directly at the seat of the disease—in addition, it may be, to local pain. Affections of the conjunctiva or of the outer layer of the cornea produce no referred pain. Injury to the surface epithe-

lium of the cornea produces an intense smarting pain, which is well defined and local. It is exactly equivalent to local pain produced by injuries to the skin. If, however, the deeper layers of the cornea be affected marked reference may take place. The same is true of inflammation of the iris and lesions of the deeper structures of the eye and glaucoma, all of which are accompanied by superficial tenderness of certain definite areas of the head and face.

When brought face to face with a headache it is not an easy matter to say whether it be due to an error of refraction, which is undobutedly present, or to some other cause; or whether the eye-strain is only one of the factors in its production. In cases where the headache is made definitely worse by near work, as sewing and reading, or where it disappears under the use of atropine, we are almost certain it is due to eye-strain. In every case the forehead should be examined for mid-orbital tenderness, and the occipital region as well, and we should extend the examination for pain and tenderness elsewhere in the body, especially interrogating the second and third dorsal regions, which are definitely associated with the mid-orbital area. If pain and tenderness are present in the dorsal areas the headaches are most likely due to cardiac or pulmonary disease.

In conclusion, eye-strain is such a common cause of headache that in every case all errors of refraction and imbalance of muscles should be at once corrected, with certain expectation of relief in a very large percentage of cases. The correction of refractive errors should be absolutely exact, for unsuitable glasses may cause more headache than the original error of refraction.

It must not be forgotten, however, that there is often a period of adaptation of the eyes to the correcting glass before full benefit is experienced, and this period of adaptation may be as long as four weeks.

In many cases, moreover, even when the headaches were primarily due to eye-strain, the nerve centers have, through long continued irritation, taken on a perverted action which may persist after the exciting cause has been removed. In these cases return to the normal state is gradual and depends upon several factors, as the duration of the affection, the constitutional powers of resistance of the nervous system, and on the presence or not of an inherited or acquired neuropathic constitution.

DISCUSSION.

Dr. G. M. Black: Since reading the paper of Head I have been very much interested in this subject, and in pursuing some investigations in this line it has occurred to me that verification of the suggestions of Head depends upon the duration of the trouble. If it is a recent case I have not been able to find any specially sensitive areas, but the areas are much more marked in a case of long standing, or of long continued eye-strain. We know that these cases of eye-strain very frequently depend upon the physical condition of the patient. So long as they are able to expend the necessary nerve force they get along very well; while, on the other hand, with increasing debility the eye-strain may become very painful and we find certain symptoms. As the patient assumes his normal vigor these symptoms subside.

Dr. Stevens: I wish to thank those who have participated in the discussion, and Dr. Mills particularly. Some few years ago I endeavored to make some investigations in regard to the sensitive areas that often accompany referred pain. This was suggested by reading Dr. Head's paper. During the last year it was through the influence of Dr. Pershing that I began investigating this subject, and I regret very much that I received a message from Dr. Pershing last evening, saying that he was called out of town and that he would be unable to take part in the discussion, and he further asked me to have his remarks, which he would write out, printed in the record.

DYSMENORRHOEA, WITH REPORT OF CASES.

BY DR. MINNIE C. T. LOVE, DENVER.

Theories in regard to the causes of dysmenorrhoea have undergone many changes during the past fifteen years, undoubtedly through the better knowledge of its pathology having been gained by the enormous increase in abdominal surgery. This

knowledge gained is both positive and negative as regards treatment; and so much negative that we are justified in following up and perfecting means other than surgical for the cure of very many of the cases which come to us.

Pozzi says that the normal conditions of regular menstruation must depend on (a) the integrity of the genital apparatus; (b) the normal condition of the blood, and (c) the normal state of the nervous system. The types of dysmenorrhoea described by various authors—the rheumatic, the neurotic, the obstructive, the inflammatory, ovarian and membranous—may all be ascribed to one or more deviations from the normal requirements.

It is impossible to view the subject in any but a serious light. The term may very well be limited to any manifestation of the function of the ovaries which interferes either periodically or permanently with the usefulness of a woman. In this day, when woman's field has broadened out into every form of usefulness in the world's work, the preservation of the integrity of the pelvic organs does not admit of argument. That menstruation is a normal manifestation in both savage and civilized woman I firmly believe; that it is growing less normal is a fault of our habits and artificial life. Fortunately for the race, degeneracy is as manifest in the procreative power of the female as in other portions of the nervous system, but humanity dictates that at least the suffering shall be mitigated, and that the increasing minority of dysmenorrhoeics shall be relieved. Not a small number of women spend fully half their time in suffering through this cause; more there are from two to three days in each month, and others all the time.

You are all familiar with the various methods of treating this trouble—hygienic, medical, surgical and electrical. Each method has its undoubted place, either alone or in combination. Tumors of the ovaries and uterus, as well as lacerations giving rise to symptoms, must be treated surgically; but I will not consent to removal of the ovaries for dysmenorrhoea purely until everything else has been exhausted.

The class of cases which appeals to me most are the young women and girls who suffer for years; who have been dosed and "built up" without relief from suffering until they are completely discouraged. Almost always the reason tonics don't cure

is because there exists various degrees of inflammation, erosions, leucorrhoea, and probably some irregularity of development of the uterus or adnexa. False ideas of modesty should not condemn them to years of suffering, besides wasting the time when nature is still in the mood to be assisted. I realize fully the risk I take in again calling your attention to the use of electricity—the risk of being called a one-remedy woman—but I must. I think the happiest and quickest results follow its use after operations either for repair or serious endometritis. Where curettage is indicated it should always precede every other form of treatment; but it is not always necessary. I regret that I cannot give the microscopic appearance of the endometrium after treatment with electricity, as one of the authors in the American system demands in proof of the efficacy of this remedy; and I fear I have not the means at my command to be as really scientific as I would wish in the report of cases which I offer, as I am a bad keeper of books; but I believe my patients forgive me this when I cure them. As a matter of fact I do not believe anybody knows the scope of every remedy that is used to heal the sick, nor do I believe that any one can yet give the exact local interpolar or reflex effect of electricity as applied to the living organism. I do not think I am justified in refusing to believe statistics of its action reported by otherwise reputable men, any more than I refuse to believe surgical statistics, and I have "proved the pudding by eating it." The action of galvanism is probably almost entirely nutritional; stimulating the lymphatics, increasing the circulation through the pelvic organs, and thereby also acting as a nerve sedative. One is forced to believe in the blood changes while watching a decidedly blue uterus grow pink under the application of electricity to its neck.

The number of cases is small which I report, both because of lack of careful history taking, and because I have not mentioned or included a number of cases whose dysmenorrhoea was only an incident in the totality of suffering and who were cured of it while being treated for the conditions which gave rise to all the trouble.

Case I. Miss K., age 21. September, 1898. Increasing dysmenorrhoea for several years, leucorrhoea and general debility, cervix badly eroded, uterus low, pain worse before flow. Began

applications of galvanism and faradism to abdomen and endometrum tri-weekly about two weeks before period. Following period almost painless. Continued application bi-weekly till about twenty treatments had been given. Health and strength steadily improved; periods practically painless. Patient gained fifteen pounds in weight and has continued well to the present time.

Case II. Miss C., age 24. Excessive menstruation, dysmenorrhoea, anaemia. Had tried tonics, etc.; no permanent improvement. Leucorrhoea, erosion of cervix. About fifteen applications in all; left her with a normal monthly loss and no pain. Health continues good, and she performs her duties as stenographer without discomfort.

Case III. Miss N., age 20. June, 1899. Excessive pain, too frequent menstruation, obliged to go to bed at least one day with beginning menstruation. About ten applications in all resulted in postponement of flow from twenty-four to twenty-eight days, relief from pain, and improvement in general health. She is a school teacher.

Case IV. A. A., age 26; domestic; 1897. Backache all the time, severe dysmenorrhoea and irregular menstruation; uterus retroverted, large, prolapsed, endometritis with leucorrhoea. Applications bi-weekly for about four months. Complete relief from backache and menstrual pain. Uterus remains in good position and much reduced in size.

Case V. Mrs. A. T., age 20, married nearly two years, sterile. Dysmenorrhoea very severe since puberty, irregular and scant. Uterus small, cervix bent forward, fundus forward. Treatment for two months. Menstruated on time without pain, became pregnant and miscarried at five weeks. After treatment for about six weeks again pregnant and carried to term.

Case VI. Mrs. F., married, two children; 1896. Dysmenorrhoea since first child born, slight cervical scars, subinvolution, etc. Bi-weekly applications to endometrum for about three months. Tears healed open, but inflammation subsided with involution and cure of dysmenorrhoea. After subsequent childbirth she remained well.

Case VII. Mrs. B., married, two children. Same as No. VI, with same result.

Case VIII. Mrs. G., married, one child; 1896. Dysmenorrhoea since birth of child, irregular and scanty. Small laceration of left cervix, left ovary swollen, tender and prolapsed. Pain nearly all the time. Sinus in perineum from stitch hole abscess. Had been treated steadily for a year following confinement. Galvanism applied to endometrum and also to ovary bi-weekly for about four months. Would not consent to any operation. At present time says she doesn't know she has any ovaries and has no pain or difficulty during menstruation.

Case IX. Mrs. B., age 22, married, one miscarriage. Irregular, scanty and painful menstruation, has always had pain. Two months' bi-weekly treatment cured pain, increased flow, and menses came regularly; subsequent pregnancy carried to term.

Case X. Mrs. M. L., widow nine years, iii para; school teacher; 1898. Trouble dated from birth of oldest child, about fourteen years ago. Year before had severe illness, diagnosed appendicitis; never been free from pain since; during menses, which occurred every twenty-one days, in bed three days. Large mass in right side of pelvis, quite sensitive, size of small orange; old lacerated cervix and perineum. After six weeks' preparatory treatment operated for repair. After three weeks used bi-weekly applications of galvanism to exudate and endometrum. Pain gradually disappeared, also exudate. She was obliged to go to work teaching school, and at times suffers some annoyance from leucorrhoea and ovarian pain, but considers herself well.

Case XI. Mrs. H., 35 years, one child 11 years old; 1898. Much the same condition except no pelvic mass. Mind very much affected; had to be watched; would wander away. Repaired lacerations and continued treatment about three months. After cure able to work on the farm and attend to all the housework.

Case XII. Mrs. L., 36 years, iii para, married fifteen years. Case almost exactly like No. XI, except mental symptoms much worse. Said the Lord told her to be operated on for repair of lacerations, but would not consent to any after treatment. Repair was excellent of both perineum and cervix, and patient has been very much improved, but is very intense in her religious

convictions. I report this case as showing that operation alone does not always cure.

Case XIII. Miss L. P., aged 25. February, 1899. Irregular, scanty and very painful menstruation since began. Pain begins with flow and continues three days with vomiting. Pain so great that she threatened suicide. Had had a great variety of physicians and treatment, but had never tried electricity. Uterus small, sharply anteflexed, and so eroded that the bleeding was quite free following digital examination. Curetted and put in stem to keep canal patulous, as it was impossible for her to stand the pain of trying to put in electrode. Menstrual period while stem was in place was painless. Second period painful; third period, pain increasing. She had been continuing the electricity bi-weekly since about three weeks after operation. She became discouraged and wanted to stop. I coaxed her to continue because of the result obtained at first; she did so, covering a period of six or seven months, taking weekly and finally monthly treatment. Since November, 1899, she reports herself cured. She now does large washings and attends to her duties without loss of time. Her general health is greatly improved and she rides a bicycle almost daily.

The two following cases are partial failures:

Case XIV. Miss A. B., age 22. German girl with poor fibre, bad stomach, and is "completely discouraged." Had been dilated under anaesthesia and every possible treatment tried to cure a very bad dysmenorrhoea. Pain began with flow, and lasted four days; this left her in an exhausted nervous condition. I could not pass the finest sound into the uterus; it was badly developed, cervix small, fundus sharply bent forward, and whole organ drawn to the left side. With great difficulty I succeeded under chloroform in curetting and inserting a stem. This remained in place for about three weeks, until after the end of the following menstrual period, which was not quite free from pain. Subsequent treatment was not satisfactory enough to encourage her to continue, and although she has remained much better, I think if she had persisted she would have been as well as she probably ever can be. The dysmenorrhoea was much improved, but the stomach remained so bad despite lavage, diet, etc., that I consider her a failure.

Case XV. Miss E. S., age 20; 1896. Very severe hysteria for four years. Mother and father both consumptive. Patient came to Colorado with cough and spitting of blood some years before I saw her. There was dysmenorrhoea, with excessive flow. Had had local treatment from two or three other physicians. Curettment, followed by bi-weekly treatments for three months, enabled her to attend a business college and subsequently to fill a clerical position where she has since remained, with an annual semi-relapse and complaint that she suffers pain every month. She has a hysterical manner of complaining, and has retained the original gain in weight of from 108 to 150 pounds. This is but a partial cure, and I believe only marriage with just the right mental handling will ever effect a permanent cure.

Dysmenorrhoea being but a symptom, the diagnosis is certainly easy, and the pathological conditions leading to it are so well set forth in the various text books that it is not necessary for me to go over them with you.

SOME MEDICAL AND SURGICAL EXPERIENCES IN EQUATORIAL AFRICA.

BY ALBERT L. BENNETT, M. D., DENVER, COLO.

In presenting a few medical and surgical experiences in Equatorial Africa before the State Medical Society of Colorado, I do so fully appreciating the courtesy shown me by the request for such a paper, and, feeling that it would be wrong to take up the time of this society by any lengthy paper regarding work done outside of this state, I have decided to present a few cases, culled from my case book, which I trust may prove of some interest.

In March, 1898, I was transferred from Bululand, in the German sphere of influence in West Africa, to the Congo Francais, for the purpose of opening medical work among that great

and powerful tribe of anthropophagi, known as Fang. My residence and hospital was about fifteen miles north of the equator.

The first anaesthetic (ether) was given to one of these people in March, 1898, the first man willing to be "put asleep and cut up" being the village witch doctor The operation was a slight one for removal of some tuberculous glands; but some of the natives present escaped to town and spread the rumor that I had killed the medicine-man and was now cutting him up. Fortunately, by the time a large hostile crowd had reached the hospital, my patient was out of the anaesthetic and able to tell the people what a brave man he was, which he did without limit. After the first anaesthetic things became a little embarrassing; everybody wanted the "sleep medicine" for the slightest pain, insomnia, or to forget domestic troubles. An African chief owning from ten to a hundred wives is not infrequently a much worried man and eminently deserving of pity.

Before leaving for Africa, Drs. Eskridge and Pershing, of Denver, both asked me to note any forms of nervous diseases among the natives; but such diseases seem to be extremely rare, doubtless due to their having no thought for the morrow, or being worried with the cares and responsibilities which have to be met by the inhabitants of highly civilized lands. The only case which came under my notice of more than passing interest is as follows:

Bartilon, a male Fang, aged 55 (?), had considerable local fame as a witch doctor, owing to the fact that he "picks up fire" without feeling pain. I was asked to see this man because of sores that "would not heal." I found the patient greatly emaciated, the heart action very rapid and its apex beat plainly visible through the thin chest wall. The left shoulder presented a horrid sight, a large mass of muscle having sloughed away, the result of a burn, leaving a large running sore which gave forth a most offensive odor. Only the little finger of the right hand remained, the thumb, first, second and third fingers having been burnt off; all the stumps being fairly well healed. The history of this case was peculiar. The patient was found by some friends "sleeping in the fire," into which he had rolled while asleep, from the long, low, native bed placed near the large fire burning on the ground of the palavar house; and when found

his shoulder was roasting in the hot ashes. Since that time he was looked upon as a great "Ngangan" (witch doctor), whom fire did not hurt. When making "biang" (witch medicine) he would pick up burning wood and hot ashes, and only since his fingers of the right hand burnt away did he desist from such practices. The emaciation was extreme and the muscles of arms and legs showed unmistakable signs of atrophy. All reflexes were exaggerated and sense of touch seemed normal, but thermic sensation was absolutely lost. I recorded this patient as a typical case of syringo-myelia. He lived about six months after I first saw him, and, while I will not now take up time to give his subsequent symptoms, I believe he died of myelitis and secondary hemorrhage.

Of malarial fever I will simply state that the natives frequently suffer severely, and on two occasions I have only controlled the terrible malarial pains by very large doses of morphine. In a country like Africa, where the white population is extremely small, we are apt to overlook the great suffering from malaria experienced by the natives; and my personal experience up to the time of my leaving the "dark continent" leads me to believe that many writers on malarial fevers, who state that the natives of malarious countries are not frequently infected with the disease, are greatly mistaken The experiences of writers are not always those of observers.

A few of the leading symptoms of malarial infection near the equator are headache—often as the premonitory symptom—nervousness, and dull, aching pains in all joints. Ophthalmia and small corneal ulcers are not infrequently associated with the disease, and I have treated patients for a most exasperating coryza whilst infected with malaria.

In treatment quinine is of undoubted value, but my experience with arsenic has made me feel that this latter drug is even of greater value. I give the arsenic in form of Fowler's solution immediately following the administration of quinine. Methylene blue I found useless except in chronic cases. I believe that in almost every case infection is either through the respiratory tract or by inoculation from mosquitoes or other diptera yet to be discovered as transmittors of the infection

In the great forest belt of Western Africa, where my work was situated, untreated accidental injuries are very numerous.

Surgery is plentiful, and I found the Africans even more willing to accept operation than the Chinese, especially the women. Cases of ununited fractures, mal-union and pseudarthrosis are common. Compound comminuted fractures from gun-shot wounds are very common. The natives are constantly engaged in some tribal war (palavar) and waylay each other in the bush; if a man comes along a path the enemy in waiting fills him full of broken iron pot used as bullets in the old-fashioned flint-lock muskets—the only weapon the traders are allowed to sell to the natives. If a woman comes along the path she is at once shot; the men prefer to shoot a woman because, as they told me, "she can't shoot back." Iron cook pots obtained from traders are broken up into small pieces and poured, by the handful, into the musket, and then, on the first opportunity, poured into the unsuspecting traveler. On one occasion a man was brought to me having no less than twenty-two wounds from one shooting, and it took me the greater portion of the day digging out mineral from this human iron mine. The equatorial heat, due to the great humidity, makes one very tired, when, after a long morning without patients in dispensary, two or more operations must be done before sunset.

Quite recently I reported in the Annals of Surgery of Philadelphia the treatment of ununited fracture in Africa with the clamp of Dr. Parkhill, of Denver. Nine cases of complete union out of fourteen operations with the clamp encouraged me much.

Diseases of the eye are not very common except senile cataract, and the practitioner must be prepared to operate for cataract wherever he travels; and the gratitude of the natives is unbounded and lasting. During nearly two years in Africa I did not see a single case of trachoma.

I will close by reporting in brief a case of ligature of the innominate for aneurism of the right common carotid, involving the subclavian. (Photographs of case shown.) This case I hope to report in detail later. It was operated on May 6, 1898. The patient was a male Fang, aged 55 (?). I was called, in great haste, to see him and obtained the following history: His throat had been "growing large" on the right side for many seasons (years). He often felt like choking to death, and to get his breath at such times was very hard. The movements of the swelling

(throbbing) caused him much distress, also the quick movements of his heart. Several times all things "became dark" and later his people told him he had fallen dead (fainted). I will not, on this occasion, give the symptoms in detail, except to state further that patient stated that he knew an enemy had bewitched him and he must die. The diagnosis of aneurism of the common carotid was made, and operation was done by request of all the patient's friends.

I can assure you to do such an operation inside an African hut, with only two black assistants, is not very easy. Permit me to-day very briefly to describe the operation. Patient was prepared as aseptically as possible. Two tightly-rolled sheets were placed under shoulders of patient, so that the head fell well backward; the right arm was strapped down to the side, causing depression of the clavicle and thus giving better opportunity of depressing the carotid. The first incision was about 10 cm. in length and followed inside border of the sterno-cleido-mastoid down to the sterno-clavicular junction. An incision of about 11 cm., above and parallel to the clavicle, met the first incision at the sterno-clavicular junction. Flaps, including skin, superficial fascia, and platysma were turned back, and the sterno-cleido-mastoid sectioned about 3 cm. above its insertion.

Division of the sterno-thyroid and sterno-hyoid brought into view veins which I took to be the inferior thyroid. Not daring to take the least risk of a hemorrhage from wounding these veins, with the assistants at my disposal, I tied them off with two ligatures and divided between. The triangular flap was turned up and hooked back. The dissection had been done very slowly and cautiously and the large aneurism of the common carotid was now fully exposed, which involved the first portion of the subclavian. I had fully decided before starting the operation not to attempt any work in the dark, but to turn back the clavicle and, if necessary, remove a portion of the sternum. The next step, cutting away a portion of the manubrium at the interclavicular notch, was slow work, needing great care; for, with undue haste, considerable damage might have been done by the heavy bone forceps slipping. Finally a portion of the sternum was cut through and turned back with the clavicle, and supported by a flat retractor turned on its edge, giving a good view

of structures beneath and room to work. The right and left brachio-cephalic veins were in view, the innominate artery, and on its right side the pneumogastric nerve. All this time my black assistants were doing good work, especially the ones giving the ether. I had prepared for a ligature a piece of flat tape, 3 m. m. in width, which I hoped, by tieing carefully, to leave around the vessel—a ligature having a broad, flat surface, which would exert even pressure and lessen the danger of cutting through the artery and causing death by the usual sequela—hemorrhage. With a small-edged file I had so enlarged the eye of my aneurism needle that the tape ligature could be easily threaded. After opening the sheath on a director, two tape ligatures were passed around the innominate and tied. I am not sure how far the lower ligature was from the aorta, but think the distance was fully one inch. Carefully feeling that portion of the innominate between the ligatures and not detecting any sign of pulsation, I severed it between the ligatures. The entire field of operation was now wiped dry with gauze sponges; the severed ends of the innominate were perfectly dry, and the stump outside each ligature was fully 5 m. m.

The clavicle was pressed back in position and wound closed, and patient carried to bed. He rallied well and seemed cheerful. Strychnia sulphate was given—1-30 grain every three hours—and at the same time 1-8 grain of morphia hypodermically. I decided, if the man lived, to remain in the village for at least ten days and watch the case. All pulsation in the neck had ceased and I could find no pulse at the wrist. On the second morning after operation I began to hope for a successful issue, since the patient seemed so bright and cheerful, only complaining of cold. More blankets were put on him and a fire lighted. During the third night I was awakened from my sleep in great haste by one of the men, who told me the patient "suddenly sat up in bed and then fell dead." The moaning of the women could be plainly heard across the street. When I reached the bedside the man was quite dead, the immediate cause of death being secondary hemorrhage.

My native assistants deserved the highest credit, although I wished at the time that I might have had the aid and counsel of some experienced surgeon at an operation which even in the

most skillful hands has proven, up to the present time, to be almost a forlorn hope.

The case of ligature of the innominate artery reported by Dr. Herbert L. Burrell of Boston in 1898 was the twenty-ninth operation of the kind ever attempted; and the case I have had the honor of reporting to-day I believe is the thirtieth on record. I am greatly indebted to Dr. Burrell for literature regarding the previous twenty-nine operations performed by men of different nationalities.

DEGENERATIVE RESULTS OF DEFECTIVE HEREDITY.

BY CHAS. DENISON, M. D., DENVER, COLO.

The subtle influence of defective ventilation upon the young, and their susceptibility to the evil effects of vitiated air, lead us to consider the urgency of their needs. The auto-infection of rebreathing the respired air causes a lethargy and enfeeblement of the nervous system, which in turn has a deleterious influence especially upon the respiratory system. The result of this is seen in physical defects, i. e., the stooping shoulders, and the flat and narrow chests of badly brought up youths. The experiments of Lablanc (1842), Claude Bernard ('57), Valentin ('61), Paul Bert ('70), Merkel, Beu, Ranor, Brown Sequard and d'Arsonal ('92 and '94), Bergey,[1] and especially of Dr. W. B. Richardson ('61), seem to prove that the usual notions of people as to the deleterious effects of moderate excess of carbonic acid in the inhaled atmosphere are just about as unfounded and unreasonable as is the extravagant and exaggerated fear of a draft which generally prevails.

Richardson's experiments show that the deleterious influence due to deficient ventilation come from the annullment of

[1]The composition of expired air.—Smithsonian Publication.

the atmosphere's vitality through the consumption or change of its electrical or magnetic property. The motion of the air, aided by the light, warmth and electricity conveyed from the sun, is the one thing needed to perfect its re-respirability. Von Pettenkofer (1861) claimed the excess of carbonic acid is simply an index of the air's other impurities. I should say, with Richardson, that it is an index in evidence of the necessity of re-vitalization by the electrical or magnetic power, which essential quality constitutes its life, its suitability for healthful respiration.

The will power is also dwarfed by the depressing influence of deficient ventilation, and the mind rendered unable to properly appreciate the force of either argument, precept or teaching. The only way to compass this great difficulty is through the systematic incorporation of good ventilation and *physical exercise*, and perhaps of manual training, in all grades of schools, from the primary up to the college. Our minds and the thoughts of educators everywhere must be turned more in this direction. The whys and wherefores once generally recognized, a persistent demand made upon educators for physical training and systematic exercise or recreation to be incorporated with hours of study, also a demand made for the thorough ventilation of school as well as living rooms, then a great reform will be inaugurated. Thus a future of health and prosperity will be the natural possession of many a youth who will otherwise be doomed to degeneracy.[2]

This degeneracy means consumption, and, if you will permit the reversal of the order of these terms as given by some authors, finally tuberculosis. There has been a close following by the laity of the medical teaching as to the limited significance of the term tuberculosis. If we are to persist in confining this term to a disease initiated *by* and always associated *with* the bacillus of tubercle, then truly we need another name to cover the whole disease, i. e., from the manifest degeneration which starts in deficient lung ventilation, with its resulting auto-infection or self-poisoning, up to the final act in this *process of*

[2]"The Advantages of Physical Education as a Prevention of Disease," by the author. Read before the American Academy of Medicine, Denver meeting, June 4, 1898.

dying. We can not help it if thus going back of the germs leaves the way open for the advocates of spontaneous generation (abiogenesis) to claim that this reasoning is an argument in their favor. We have not yet complete knowledge of the spore formation of the bacillus of tubercle. This germ must have had a beginning some time; and now it apparently has millions of beginnings. As with cancer, there is something more to be learned than we now know of tuberculosis.

Our biologists have many hard questions to solve, but few, I judge, of more importance than this one. As for myself, not as a biologist, which I am not, but as a plain, practical man, I have come to a belief that tuberculosis in a latent form goes back to the degeneration from which it springs. We need a new definition for this dyscrasic or degenerative disease. If tuberculosis is not the proper term to apply, then we can fall back upon the old and more comprehensive term, consumption, and say, *It is a degeneration or slow death due to the vitiation of the blood, generally produced by deficient ventilation of the lungs, a prominent and advanced sign of which is the bacillary germ of tuberculosis.*

The study of tuberculosis in its origin and progress is intimately associated with that of degeneracy and degenerative traits, as shown in the study of the heredity of deaf-mutism, color-blindness, cancer, drunkenness and crime. Admitting this, it has yet seemed to me important to try to hold the mind to the thought of a degeneracy or dyscrasia which springs from deficiency of ventilation, either without or within the lungs, rather than to single out, from the variously combined traits in the defective class, any other peculiar degeneration which makes for tuberculosis. I may do injustice to syphilis by my partiality in this presentation, for lack of time to consider the bearing of that disease upon tuberculosis; but no injustice is done to scrofula or to cancer, so nearly are their dyscrasia related to tuberculosis.

The degeneration which pertains more especially to the mind we must of course leave out, simply remarking, apropos of Dr. McKim's late work on "Heredity and Human Progress," that while it does not now seem to us expedient to fully endorse his peculiar measures for exterminating the defective class, yet

there is, in the facts he presents, a decided corroboration of this degeneration which makes for tuberculosis.

The phases of our civilization which work for degeneration, and so also for tuberculosis, were summed up by me in five general propositions and presented to the American Public Health Association at the 1895 meeting in Denver. Referring thereto for the detail argument, I give the conclusions:

First. *The advance in the healing art, in so far as the saving and prolongation of life are concerned, suspends the law of natural selection and permits the weak to propagate their kind.* It is the doubling of like strains which here intensifies degeneration. I have elsewhere stated[3] "There is a transmission to offspring from parent or parents of a remarkable susceptibility, and of peculiarities of blood and vitiated vitality, which furnish the required pabulum or field for the growth of the tubercle microbe. The soil and conditions under our present civilization are constantly made more favorable for the development of the disease, while our ability to combat it is also increased under our advanced knowledge of its aetiology and arrest. But with all our splendid climatic and other advantages arrest is not the eradication of the disease; on the contrary, the total of hereditary influence is necessarily increased because more affected persons survive. Undoubtedly the increasing average of longevity of civilized people is in no small degree due to the prolongation of the lives of chronic invalids. Thus it becomes an open question, Do not the valetudinarians equal the healthy in longevity? Consequently it results that Darwin's law—the survival of the fittest—is in danger of becoming obsolete, while the total of bad inheritances is in no sense lessened. The vicious seed is not destroyed, but preserved, to be again mixed with the good. 'Like begets like,' only more so in the case of these recovered consumptives, and it becomes a serious problem how a community like that in Colorado, largely made up of recovered invalids, will be governed in future, that a normal state of health may be assured to her inhabitants."

Second. *The present civilization stimulates the intellectual and nervous system to such an extent as to injure the physical (reproductive) powers and favor sterility.*

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[3] "Degenerative Heredity."—N. Y. Med. Journal, December 14, 1895.

This mastering incentive to excel, admittedly the source of improvement of the race in refinement and power, is nevertheless undoubtedly a principal cause of the decadence of that race in physical well being. There is a weakening at the top, portending the not distant extinction of that quality, unless it be constantly replenished from the lower orders of the race.

In the social world the unfortunate demands of caste, and the appreciated cost of the honors and responsibilities of parentage—each generation seeking to outstrip its predecessor in the comforts and refinements of life—too often furnish excuses for a celibacy or a state of immorality which deprives the earth of what ought to be, under more favorable circumstances, its most prosperous increase.

In the intellectual world the same incentive to excel, the demands of time and study necessary to proficiency in professional life, furnish further and additional excuses, with those who do marry, for a delay in assuming the responsibilities of parentage till the total effect can be seen in the gradual extinction of these higher classes.

Patten, in his "Development of English Thought," believes that "there may be some general law that makes fertility depend on the amount of nutrition," and though "its decrease may be mainly due to the over-stimulation and nervous excitement that modern society forces upon women," yet he claims that the present prevalent sugar diet, and the over nutrition of women decrease their fertility. He declares that "the elimination of sensual men, and of women made inactive by art, literature and sugar diet, are the prominent causes of modifications in the national character."

Third. *The social, commercial, and manufacturing phases of our civilization favor indoor and inactive modes of life which are detrimental to successful physical development, and inheritance propagates the depreciated life force.*[4]

Fourth. *The independent self-supporting of women, chiefly in clerical positions, removes from the probability, if not the possibility, of successful motherhood a considerable portion of the so-called*

[4] "Degenerative Results of Deficient Ventilation," read before the Am. Climatological Asso., May, 1900.

gentler sex, through the resulting great decrease in matrimony and the exhaustion of the vital powers of women in nerve taxing occupations.[5]

Fifth. *The present unaided efforts of natural selection should be supplemented by warning the young before matrimony. The masses ought to be educated physiologically that the laws of heredity may be understood, that physical development and mental strength may be appreciated, and that the responsibilities of parentage may be recognized.*

Reflecting upon these important truths, I formulated a *rule of marriage selection to avoid consumptive offspring.* It is here submitted as at least a partial guide to young persons when considering, as all are expected to do, this vital question; also as an aid to their advisers and parents. It is founded upon observation of the child mortality in certain families; also upon the study of the highly wrought nervous organizations, affording greater susceptibility to infection, and of the constitutions with less resistance to disease which degeneracy in parents gives to their offspring. Therefore, the excessive mortality *before* the age of five years, in previous generations of a given family, is a measure, so to speak, of the degeneracy of that family.

RULE OF MARRIAGE SELECTION TO AVOID CONSUMPTIVE OFFSPRING.

Find the *proportion* of all the mother's and father's and their married brothers' and sisters' children born—i. e., the party's parents', uncles' and aunts' children—who were living at five years of age.

1. Then (excluding deaths wholly attributable to accident or having nothing to do with disease), if less than eighty per

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[5]"Considering the chief and most enduring function of women to be the bearing and guidance of the young, what a large class of them fall short of this their created purpose, to the extent that they are simply passing incidents of the world in which they live. These healthy, independent women are, however, better suited for motherhood than those who are left to take their places. Civilization has to fill innumerable gaps and start new genealogies from baser materials."

cent. of such children were alive at that age, there is reason to suspect a weak strain in that lineage.

2. If less than sixty per cent. of such progeny were then alive, there is strong proof of such degeneration.

3. Add to this, or consider it separately, that either the party's mother or father or any two of his or her grandparents, uncles, aunts, brothers, or sisters died of consumption, cancer, or scrofula, and the proof of some defective biology in that family strain is still more evident.

4. Add to this the party's health not good, even so little defective as "never very robust," or the person now flat-chested and under weight, then his or her fitness for parentage is still more impaired.

5. Double this tendency to degeneration by uniting two family lineages equivalent to the above section 3 on the one side and to section 4 on the other, and a sin will be committed by such marriage only second to the marriage of a healthy person to an invalid in active tuberculosis, which latter should never be consummated under any circumstances. The only concession possible which would allow of such marriages is the non-bearing of children, that this lineage may end with the contracting parties' lives.

Many conditions may be mentioned which would intensify the gravity of this reckoning, as, for instance, a strain of epilepsy, insanity, intemperance, or scrofula existing in the progenitors' families; or the concomitant conditions, such as poverty and a climate favoring consumption, inseparable from the contracting parties' lives.

Let intelligent and forceful instructors take this matter up as a study with all students, male and female, during the graduating year of the school or college life, so that there may be a thorough understanding by young people of their responsibility and duty in this most vital matter.

Here is a movement which could be commenced at once if only there were the intelligence and force to do it rightly. We need to be educated to a higher plane of living. It is asserted that "love is blind," that, whatever you say, young men will make fools of themselves in choosing a wife, and that girls will repeatedly "turn down" proper offers of marriage only to "pick

up a stick" of a man in the end. Let me say that under a proper system of education, and a discreet enlightenment of the young as to their responsibilities, "love will go where it is sent" and it will be sent to the right place.

The fundamental need of posterity is not only to be brought up right but to be born right, and it will be a great blessing if a more intelligent and wiser mating of temperaments can, to a degree, displace mere sentiment in matrimony.

The study of this subject of degeneracy in its relation to tuberculosis leads to other possibilities of legislation besides that which shall relate to the question of marriage. We have now little time to consider this or to suggest what the state's treatment should be of its wards—the confirmed degenerates, criminals, the insane, the lepers and the specific disease vendors, whose lives are all menaces to the well being of society. There is a method to consider, and perhaps to adopt, better than the arbitrary extermination by death of these defectives, as proposed by Dr. McKim.

The hesitancy to enter upon the discussion of this subject is natural, considering the prejudices of people and the necessity of thorough and systematic investigation before an intelligent determination is possible. Admitting the objections which anything so radical naturally excites, permit me to make a few observations to be taken *only* as suggestions. Candor compels us to admit that this proposed substitutive procedure—desexualization—however skillfully and painlessly it might be performed through the extra precautions taken by the chosen servants of the state, does not meet the requirements of a certain proportion of the cases which justly and necessarily come under the guardianship of the state.

Candor also compels us to admit that that judgment is perverted which values the lives of murderers, idiots and the hopelessly insane so highly that they must be preserved to further contaminate what ought to be a healthful society.

In regard to the three classes just named, when, as Dr. McKim conditions it, *they come under the care of the state,* the question whether it would not be better and safer for the rest of humanity if they were not allowed to live is certainly a reasonable one for official investigation.

Our knowledge of these extreme degenerates does not have to be extensive to make us appreciate the dire calamity of their existence. Many of us know of instances much like the following lamentable case which, for the effect of emphasis, is here related in the form of a petition of the parents for relief from their misery:

"To the Legislature of the State of .....: Your petitioners, ... and ....., husband and wife, residents of the town of ....., state of ....., respectfully represent that one of their six children, a daughter aged 20 years, is a hopeless imbecile, a groveling idiot, not susceptible of any education and not possessed of any knowledge of right or wrong or of cause and effect; that her existence has been a burden to all her relatives; her presence in the family circle has been a blight upon an otherwise happy home and a great discouragement and positive injury to the lives of her brothers and sisters.

"Your petitioners further represent that they believe this affliction was caused by a fright of the mother while this child was *in utero;* that while no blame is attached to this creature's parents for her being, the laws of the state do not recognize the right of her parents nor is it the duty of any one in authority to have her life taken that this worse than useless existence may be brought to an end (even by such painless, and by her undetected, means as gradual suffocation by carbonic acid gas). Your petitioners therefore, believing the state to be responsible under these circumstances, humbly ask your honorable body to take this matter in hand, to have a commission appointed to examine into the true state of this creature's mind and body, and if the within facts and statements are thereby verified, to carry out said painless extermination of this defective life."

This is one of the many difficult problems to be settled in connection with this subject of degeneracy.

The first thing to be done is to investigate so as to know what to do.

What an excellent thing it would be if a governmental provision could be made for a salaried investigating *Commission on Hygiene and Racial Improvement,* of say three to five distinguished physicians, students or authorities in biology, hygiene and so-

ciology. This commission should be so appointed that the best selection would be made in order to thoroughly investigate the following important questions, upon which they should be required to report the form of laws to be submitted to state legislatures for their consideration and possible enactment, i. e.:

First—For the legislative control of marriage on the basis chiefly of physical fitness, with the object in view of racial improvement and future prevention of disease, especially tuberculosis. The education of a licensing class, from which to choose boards of control in the separate states, would properly come under this commission's investigation. The popular education of the young before graduating from advanced schools and colleges, as hereinbefore advised, would also be a part of their study.

Second—For the possible limited use by the state of painless death without the knowledge of the dying, in order to rid society of the useless and harmful lives, which, in the persons of murderers, idiots, moral imbeciles and degenerate and incurable lunatics, *come wholly under the state control and care.* This should be done only after a finding of a specially prescribed, thorough investigation by an impartial and fully competent examining board. As McKim says, "Here lies a field which promises rich fruits to earnest inquiry, in the course of which a modicum of intelligence would have far more worth than a flood of sentiment."

Third—For the limited and legalized use of desexualization with the purpose to ameliorate and limit degenerative diseases of advanced types, to arrest degenerative practices tending to imbecility, and as a punishment for gross crimes, as rape, incest and bestiality.

A lawyer friend, a man of experience and exceptional judgment, says of our confirmed degenerates,—criminals, the insane, lepers, etc.,—"Let the commission, at whose instances the marriage licenses issue, refuse it to all persons coming within the tainted degrees, and let it be a penal offense for all such persons to cohabit and rear offspring; and, if in the face of these preventive provisions persons are found violating these laws, let them be desexualized."

These are three of the unsolved problems of our imperfect civilization which could be worked out with great good to the human race by such an inquiry as here suggested. Before such an

investigating commission the fittest and wisest representatives of the learned professions could be called to aid in rightly determining these unsettled though momentous questions. It is either *evolution* through a wise recognition and correction of our faults, or else inevitably *dissolution* because, like the lower animals, we fail to comprehend our mission in life and to adjust ourselves to our environment.

The conclusion of the study of the degenerative results of deficient ventilation and of defective heredity is the following proposition which I have endeavored to establish, namely:

That "tuberculosis" is the outgrowth of a prevalent degeneration, due to our faulty civilization and largely propagated by heredity, the bacillary infection being but an incident thereto.

DISCUSSION.

Dr. A. Stedman: Mr. President, Ladies and Gentlemen—I wish I had come to this meeting better prepared to do justice to the paper which we have just heard,—a paper which contains some suggestions with which we agree, some which I question, and some suggestions which I should oppose. I quite agree with the doctor in his estimate of the degenerative tendency which shows itself in the diseases—chronic diseases—with which we come most in contact. The doctor omitted, or rather included among the conditions of life, one item to which I would like to call his attention, and that is the subject of food; not only impure food, but improperly prepared food for growing children and working men and women, putting them in a condition susceptible to the inroads of disease—where they are very easily approached by either of these diseases. This vicious tendency belongs to the domain of criminology rather than medicine, and that I am not prepared to discuss. I appreciate—so do we all—the unfavorable social condition with which we are surrounded, the unfavorable rush and hurry with which we have to do business, and the unfavorable conditions in which many of the working class live. I think if legislation is called for for any particular purpose, it is to ameliorate the condition of the working people and those who live in tenement houses. I think municipal

governments have a legal right to regulate that, and the tendency of the time is that it should be done. It is being done in New York City as well as other large cities. The human race have been more than a thousand years establishing individual liberty for individuals. The Anglo-Saxon race more especially are tenacious of individual liberty,—the pleasure of the man in his home, his family and his personal surroundings. No law could be enacted and enforced that would abridge that liberty. It is enacted in the Declaration of Independence, when it says that every man is entitled to the liberty of life and health. We have plenty of laws on the statute books,—we have plenty of ordinances in this city to enforce all that is necessary for the healthfulness of the city, but we find the difficulty in enforcing them.

Dr. J. N. Hall: Mr. President, I would like to say one word. The paper speaks of carrying out certain measures. It seems to me there is one thing to consider before we get to that point. We have had an example of the enactment of laws providing for the hanging of murderers. Those laws have been repealed. I think most of us, even though we may have favored the repeal, believe that so long as we are not able to have the laws on our statute books calling for the hanging of the murderer, it is going to be pretty hard to carry out such radical measures. There has been for years in the County hospital a hopeless idiot, a little fellow four or five years old. It does seem as if there ought to be some way of disposing of such an individual as that, and yet I don't see how we can get to that until we can arrive at the point where we can dispose of the man who will go out with a hatchet and kill a man in cold blood.

Dr. W. P. Munn: Mr. President, I presume the writer of this paper did not expect when he presented a paper so radical in its propositions that it would meet with the approval of all the members of the society, nor can we apprehend that Dr. Denison proposes for immediate enactment some of these measures which he advocates. There are many of the propositions which he has laid down with which we agree,—his statement of the degenerate tendency of certain families and certain races; but we should not therefore accept without hesitancy the decree that the race itself is absolutely degenerate and that we are losing ground in-

stead of gaining ground. In fact, there are many reasons for believing that the race as a whole is rising; that life is longer, and that the individual units are more perfect than they were not only a hundred years ago, but one generation ago. The factors of general education and the spread of knowledge which have contributed to this increase of virility, strength, and life on the part of the whole race are appreciated by the social scientists. We have every reason to make a special objection to the classing of tuberculosis among the evidences of degenerate tendencies that are wiping out the human race. There is no more reason to class a victim of tuberculosis among the degenerates than there is to class a victim of measles or diphtheria in that character. It happens that one is a slow infection and the other is a rapid one. A great many persons have tuberculosis and live,—they are not cured of it, but they go on living in the community. For this reason I think we may very well object to the classing of any particular class of diseases among the degenerates. Let us class thus those who have acquired bad habits and vicious methods of life, but not the victims of any special disease, and especially a disease which we know in its beginning and in its ending to have the characteristics of an infection pure and simple.

Dr. Chas. Denison: I wish to explain that my paper is necessarily imperfect in regard to including all the phases that lead up to such an important conclusion as I have tried to draw, and also that it is only half of the whole study that I have made on the larger subject,—"The Educational and Legislative Control of Tuberculosis." The other half was read in Washington a few weeks ago, i. e., "The Degenerative Results of Deficient Ventilation."

The important point in that paper was the belief or conclusion that there is a cause in this very degeneration to which Dr. Munn has objected that I applied to tuberculosis. There is a cause in degeneration which is back of the bacillus. It is for this reason that this term is applicable to tuberculosis; that, as I have tried to show, the degeneration is a necessary precedent to the germ period in tuberculosis and so makes it essentially a degenerative disease, such as the acute infectious diseases mentioned are not and cannot be claimed to be. We will never conquer tuberculosis until we ferret out and accept this underlying

cause. The cause brought out in this Washington paper is devitalized air due to deficient ventilation, and the fact that the air once used is rendered unfit for respiration again. The life of the air was then considered as the necessary condition to its healthful use. And this life consists in its warmth, light and electrical condition, which are all forms of motion. This motion—that is, these life conditions—is annulled in unventilated rooms, and here lies the most important causative condition of tuberculosis.

A point in corroboration of this was brought out in Washington when my paper was under discussion by Dr. Philips, referring to Dr. Richardson's experiments with animals. Dr. Richardson confined four warm-blooded animals, a cat, a dog, a dove and a rabbit, and also two frogs, in a glass compartment and fed them with forty gallons of pure oxygen. Though only five gallons was shown to have been used, yet breathing it over and over again these animals died, though not so quickly when the carbonic acid and organic matter was taken out of the oxygen before it was rebreathed; but Dr. Richardson sent a spark of electricity through the once breathed oxygen and the animals then all lived, showing that this vitalizing of the air by electricity made it then again fit for respiration. Another fact that was brought out in confirmation of this idea as to the vitality of the atmosphere as we find it under natural conditions out in the open, was the argument of Dr. Charles Greswell, presented to the National Cattle Growers' Association lately assembled in Fort Worth, Tex. He claimed that it was unnecessary to use the tuberculine test with cattle out on the plains, because there, if they had tuberculosis, they outlive it, and their progeny show no traces of it, showing that the life out in the open was the best possible agent to counteract or prevent tuberculous infection.

THE CAUSES AND IMPORTANCE OF DIGESTIVE DISTURBANCES IN PULMONARY TUBERCULOSIS.

BY C. B. VAN ZANT, M. D., DENVER.

My only, and yet, I trust, sufficient apology for appearing before this society with so old and trite a theme is simply its great importance. For many years the physicians of Colorado have been afforded an exceptional opportunity for studying pulmonary tuberculosis in all of its phases. In this study, this truth has impressed itself,—that of all the protean conditions affecting the progress of these lung cases, none is more frequent or important than perversion of the digestive functions. In view of this fact, we desire to use the brief time at our disposal in an inquiry as to the bearing of these derangements of the alimentary tract on the pulmonary and general conditions of these patients.

First, as to causal relations: These we shall consider under the two following queries: (a) Are dyspeptics more prone to develop tuberculosis than others? (b) Are tuberculous subjects more prone to develop digestive derangements than others? To the question, are dyspeptics more prone to develop phthisis than others, the answer seems to be distinctly in the affirmative. Osler says: "Diseases of the stomach and intestines increase the susceptibility to tuberculous infection." Again he says: "Among the most characteristic of the types of onset of pulmonary tuberculosis are those cases with dyspeptic symptoms, forming a large and important group. The patients may or may not naturally have had feeble digestion. They begin to show marked signs of dyspepsia and become pale, lose flesh and look chlorotic, before any pulmonary symptoms are manifest." In this view, of digestive disorders indirectly predisposing to tuberculosis, Osler has the support of Von Ziemssen, Woodhead, Burr and others who might be mentioned. Whatever our conclusions from our reading may be, we all have been impressed with the frequent presence of anorexia, nausea, vomiting and indigestion in our

lung cases long before we were able to make out any distinct pulmonary affection. In weighing this aspect of the matter, it has seemed to me that we might explain the development of pulmonary tuberculosis which apparently follows gastric and intestinal defects on one of the following three grounds:

First, remembering that the vagi are a common source of innervation of both the respiratory and alimentary tracts, and that they contain trophic, as well as motor, vaso-motor, sensory and secretory fibres, some may possibly be able to accept the theory of Mays, of Philadelphia, namely, that the digestive and indirectly the pulmonary conditions are due to trophic or nutritional changes in these parts, following a diseased condition of the vagi themselves. This theory lends itself nicely to an explanation of the related pulmonary and digestive disorders, and only lacks one element to make it alluring, that is,—proof. Secondly, and without doubt, the defective general nutrition consequent upon indigestion furnishes a large factor in indirectly predisposing dyspeptics to tuberculous disease. Again, if the precedent gastric condition be one of hypochlorhydria, the usual bactericidal function of the gastric juice is diminished or lost, and invasion of the system by way of the alimentary tract is thereby rendered more easy. In addition to this, the antiseptic effect normally exerted on both the stomach and intestinal contents by the HCL of the gastric juice is greatly diminished in such cases, and many kinds of fermentative processes are permitted to develop. The bacteria back of these processes not only rob their host of his needed nourishment, but poison him by their excreta. Following in the footsteps of Von Ziemssen, who in the '80s laid great stress on the protective action of the acidity of the gastric juice against tubercular infection, Burr has recently drawn especial attention to this feature of our subject. With sub-acidity of the gastric secretion, the intestines, he believes, become a veritable culture tube for micro-organisms, giving rise to toxins, ptomaines and toxalbumins, which ultimately reach the lungs, and there embarrass respiration and weaken the lining cells of the alveoli and of the capillaries. Thus, in his judgment, it predisposes to serious lung disease. Hence arises the importance of using every precaution against alimentary auto-intoxication in cases predisposed to phthisis. This remark applies as

well to the reinfection of cases already tuberculous by the swallowing of their sputa.

We will now take up our second question, Does pulmonary tuberculosis predispose to a secondary indigestion? If so, how? By most of our authorities an affirmative answer is given to this inquiry, and the experience of all here will doubtless bear out the same assertion. What, then, is the nature or cause of these secondary alimentary derangements? They may be entirely functional in character, and, as a rule, this is probably the case. Thus the activity of the gastric glands may be functionally disturbed by the profound anaemia of tuberculosis; by the hectic fever; by reflex irritation through the vagus from the lung; by neurasthenia; by various neurotic causes. Upon these latter nervous factors, Immermann and others lay great stress. Again, the glands may be normal in their activity, while the musculature of the digestive tract may be the part at fault, leading to motor insufficiency.

On the other hand, in many cases of slow onset of digestive trouble in lung cases, the symptoms may represent organic changes in the alimentary tract. In the stomach, tubercular lesions, such as ulcer, are rare; in the intestines they are common, and here they prove a notable source of indigestion and distress. Dilatation of the stomach is an occasional condition in phthisis. As acknowledged by all, however, the commonest diseased condition of the stomach in these cases is chronic gastritis. According to Pepper, Osler, Percy Kidd and others, the lung condition distinctly predisposes to this affection. It has been my own experience in a limited number of these cases of secondary gastric disorder in tuberculosis to find by examining the gastric contents, etc., that the condition was often one of chronic gastritis. The sub-acidity was generally quite marked; the amount of mucus considerable; fermentative changes were present; and motor insufficiency was common. The vomiting which is so often a troublesome symptom in tuberculosis is frequently excited by fits of coughing which are apt to arise after meals and which Kidd believes are the result of hyperaesthesia of the vagus. Habershon refers the vomiting to four different causes: (a) Pressure on vagi by caseous glands; (b) stimulation of peripheral branches of the vagi in the lungs, pharynx or stom-

ach; (c) mechanical causes; (d) central causes, such as tuberculous meningitis. Regarding the diarrhoea of these patients we must not jump to the conclusion that it always means intestinal ulceration.

As to the important bearing of these digestive disorders on the tuberculous process, too much can not be said. Our great clinician, Osler, in a recent clinic, put it thus strongly: "Write in large letters, the cure of pulmonary tuberculosis depends wholly on the stomach."

Without decrying the legitimate use of medicines, it may be affirmed that the day of poly-pharmacy in these lung cases is past, and that the era of careful nutritive treatment was long ago ushered in. The fuel for the production of animal heat and force and the architectural tissue material have to be prepared for absorption and assimilation by good digestion; and woe betide the consumptive in whom this preparation is imperfect. From my observation of a fair number of cases of lung disease during the last seventeen years, I feel free to state my conviction that a bad digestion is the heaviest incubus a pulmonary case can carry; and that, if unrelieved, it will undo climatic, hygienic, medicinal, and every other influence we can bring to bear in the way of treatment. Hence we cannot too promptly attack and attempt to correct this harmful condition. In doing so, we ought to get at the cause of the indigestion by using the same careful methods of investigation as apply to other gastric cases. Test meals should be given, the gastric contents examined for acidity, mucus, etc., and motility and absorptive power determined. Nor should the faeces be overlooked in this examination. If chronic gastritis be the condition, we will often be surprised to note its quick response to lavage and other proper methods. The growing use of strychnia in phthisis also doubtless has a strong basis in its fine effect on the gastric secretion and movements.

In the matter of dietetics, whether we prefer ordinary methods or resort to the special Debove or Weir-Mitchell methods, we all will agree with Von Ziemssen that "in selecting the environment of a consumptive, the kitchen should not be the least consideration." In the management of these cases, it has seemed to me that the fact should never be forgotten that treat-

ment, like the electric current, has both a positive and a negative pole. The one is the maxim, "Do all the good you can;" the other, "Never do harm." If the restorative impulse is to be given to these patients, it must be by a judicious use of both of these poles at the same time. To illustrate my meaning, if we give morphia or a nauseous syrup to relieve cough and thereby cause vomiting, anorexia or constipation, what have we gained for our patient? Or if we ply the sufferer with cod-liver oil to improve his nutrition, and by it derange his digestion, what profits it? I cannot conclude this paper without a reference, in this connection, to a prevalent loose practice, which deserves our strongest censure. I refer to those lung cases which come to us with the statement that they were ordered in a general way by their physicians to use cod-liver oil and whiskey. Beginning with a moderate amount of the latter, they have gradually increased it till they take a pint or more a day, and often almost undiluted. The natural result of the practice is a chronic gastritis with all the ills that follow in its train and which, in my experience, at times baffles all treatment and turns the tide inevitably against the patient. If alcoholics are needed, as they often are, it will be wiser far to use the less concentrated forms and thus spare the digestive organs. Let us beware also of those so-called nutrients, and, so far as possible, of all those drugs which lessen the appetite or promote indigestion. Let us, above all, keep in view the patient's digestion; give him simple, nutritious food; encourage the outdoor life; and often, very often, the lung affection will take care of itself.

DISCUSSION.

Dr. G. E. Tyler: Mr. President and Members of the Society —I think all of us will agree that we are under obligations to Dr. Van Zant for calling attention to the gastric disorders in the treatment of tuberculosis. I don't think he put it too strongly in the quotation he has given. It is not long since many specifics were brought to the attention of the profession, but I think to-day very few contend that there is a specific treatment for tuberculosis; rather, the attention must be given to the improvement of the general condition of the patient. I think one

reason why sanitarium treatment has proven of such great benefit is because great attention has been paid to the digestion. At Clifton Springs and other places great attention is paid to the examination of the stomach contents and the examination of the faeces. I believe we are too prone, all of us, to omit a systematic examination of the stomach contents in patients. We take it for granted that there is chronic gastric catarrh, or something else, and treat it without going into the case thoroughly enough. I wish to emphasize the importance of not being content with a single examination. It frequently happens that the examination will show a diminution of hydrochloric acid and we rest at this. But this may be due to a temporary disturbance.

I believe also that, in a case associated with diarrhoea at least, there should be an examination of the faeces, but I do not believe that it is a justifiable conclusion to assert that as soon as bacilli appear in the faeces there is necessarily tuberculosis of the intestines. I remember very well a case treated at Clifton Springs, in which the bacilli were found in the faeces, and from an observation of the case some time afterward I am satisfied that sputum was swallowed and this accounted for the presence of the bacillus. I believe that not only should dietetic measures be given large attention, but when we come to medicinal measures we should use the known remedies. If hydrochloric acid is needed, I believe in giving it. I believe in strychnia—that it will aid motility. The old tried remedies are far more satisfactory than those so often brought to the attention of the profession by the manufacturers.

Dr. C. D. Spivak: Mr. President, I would like to say that I fully agree with Dr. Tyler that the paper just read is of great importance. Indeed it seems to me that as a rule the profession have not paid enough attention to gastric disturbances accompanying tuberculosis, and even if one goes to the literature on the subject he finds but very little. I know of only one monograph which embraces the subject in its entirety, that of Soltan Fenwick, "The Dyspepsia of Tuberculosis."

I must take exception to the statement that the contents of the stomach in tubercular patients have a diminished quantity of hydrochloric acid. Investigators in this country and abroad have, indeed, found that in about fifty per cent. of all cases there

is an increase of hydrochloric acid. The presence of acid is one of the fortunate things for our patients, because it points to the fact that we should not be afraid to force good food into our patients, as they will be able to digest it, and it is indeed the best proof that we have that patients suffering from tuberculosis should be fed, and fed well.

Dr. Perce: I don't know whether I would be allowed to enter into the discussion of this paper, as I am a member of the Indiana State Medical Society. But I rise to commend the paper. I regard the subject as presented by Dr. Van Zant as the most important standpoint to take in the treatment of tuberculosis. I want to commend the doctor upon his theory. In Indiana, as you know, it is the great scourge. We depend upon climatic changes in tuberculosis, and send many of our patients to Colorado, and I am glad to see the stand taken by the writer of this paper, that more depends upon the alimentation and condition of the stomach than upon the environment.

Dr. Van Zant: I think Dr. Spivak takes me amiss in supposing I say that all these cases have subacidity. I was referring simply to those cases having gastritis. But as I remarked before, the bulk of these cases of digestive disturbance in phthisis are of functional origin, and of course in many of these cases we have the natural quantity of gastric juice or even hyperchlorhydria.

SOME PATHOLOGICAL CONDITIONS CHARACTERIZED BY THE PRESENCE OF THE YEAST FUNGUS.

BY CLINTON G. HICKEY, M. D., DENVER, COLO.

The past quarter century has marked a long stride in medical science and perhaps in nothing is this more emphatically true than in the line of increased exactness in diagnosis.. To this development no single agency has contributed more than bac-

teriologic investigation and experimentation. Clinical conditions somewhat divergent, but still supposed to belong to the same pathologic state, have been shown to proceed from causes quite apart the one from the other, and to be in reality entirely separate diseases; on the other hand, in conditions with markedly differing clinical manifestations an identity in origin has been established beyond question. Also bacteria classed always formerly as non-pathogenic have been found under certain conditions and in some forms to manifest a pathogenic character of so much virulence as to lead to a fatal termination in some reported cases.

This is asserted of a class so innocent heretofore of any suspicion of pathogenic power that one hesitates without abundant proof to give it credence, and yet evidence is accumulating from many sources to prove that several members of the Saccharomyces either have or may acquire, under given conditions, a pathogenetic character.

It is, of course, a familiar fact that the oidium albicans or thrush fungus, belonging to this class, produces certain superficial lesions upon the mucosa of the alimentary canal; it does also occasionally invade the entire organism, causing a fatal disease. In the Presse Med., August 24, 1898, occurs an article by H. Roger describing lesions produced artificially by inoculation of rabbits with the oidium, in which the granulations set up invaded the entire organism and caused hypertrophy of the kidneys, etc. It is, however, of another member of the Saccharomycetes that I wish chiefly to speak, viz., the Blastomyces.

That the Blastomyces or yeast fungus may be pathogenic has not been generally recognized, but in some quarters such a belief has now gained a secure footing. Busse, whose name has been intimately associated with experimental work in connection with the Yeast fungus, states in the Berliner Medicinische Wochenschrift, July 21, 1898, that its pathogenic character has been known to us since 1894, he himself having reported a case of what appeared to be chronic pyaemia, starting as an abscess in the tibia and caused by a Saccharomyces which produced similar lesions experimentally. Curtis, in France, has reported a case of myxosarcoma of the thigh containing a yeast fungus.

It is well known to most of you, doubtless, that for a period of several years, and especially since 1894, a persistent attempt has been made by some Italian and German, and to a limited extent also by Russian, French and English pathologists to establish the identity of the Blastomycetes with the cell-inclusions in carcinoma and sarcoma, thus making them the etiologic agents in these malignant tumors. The reports of their investigations have been published at length in the various foreign journals. Kahane, in Vienna, as reported in the Year-Book of Medicine and Surgery for 1897, "was one of the earliest to describe the presence of blastomycetes in malignant tumors, and he states in his last communication that the blastomyces which he has constantly found in malignant growths is nothing more than common yeast."

Sanfelice made inoculations into guinea-pigs of a yeast which he named Saccharomyces ellipsoideus neoformans. Those receiving inoculations into the subcutaneous tissue died, on an average, in thirty days, with local swelling at the point of inoculation, enlarged lymphatic glands in groin and axilla, and, on autopsy, nodules in spleen and kidneys, with slight lesions in lungs and liver. The nodules mentioned contained masses of blastomycetes. Histological changes are carefully noted, but I do not go into this, since my purpose is but to show that the pathogenic character of some of the yeasts is established. The editor of the Year-book, commenting upon the work of Sanfelice, which is extensive, doubts his conclusions as to the etiology of tumors, but says: "That some of the yeasts are pathogenic can not longer be doubted." Mafucci and Sirleo, pathologists also of the Italian school, while differing from the deductions of their confreres, conclude that "There are some among the blastomycetes with pathogenic properties."

In May, 1894, three months before Busse's first report, referred to above, Dr. T. C. Gilchrist exhibited before the American Dermatological Association in Washington microscopical sections from a case of skin disease clinically resembling skin tuberculosis. Certain parasitic bodies were found and described which after the appearance of Busse's paper were recognized as blastomycetes. A complete description of the case was given in the Johns Hopkins Hospital Reports, 1, pages 269 and 291.

In the Bulletin of the Johns Hopkins Hospital, July, 1896, appeared a preliminary account of a second case which, after further painstaking observations and inoculation experiments, is made the subject of an extended paper by T. C. Gilchrist and W. R. Stokes in the Journal of Experimental Medicine, January, 1898, to which article is appended a lengthy bibliography. From this paper I quote portions of the summary there made: "The case reported in this article is one of a somewhat extensive cutaneous disease, which occurred in a man, 33 years of age, who gave the following history: The disease first made its appearance, eleven and a half years ago, at the back of the left ear as a pimple, which soon became pustular. The process extended forward very slowly and gradually encroached upon and covered almost the entire face, the central portion of which now presents an atrophic cicatricial condition." A second, third, fourth and fifth secondary lesion occurred on hand, scrotum, thigh and back of neck, lasted a varying time and then healed spontaneously. "The disease when first examined presented many of the features of a lupus vulgaris. There were no enlarged lymphatic glands. The family and personal history revealed no syphilitic or tuberculous taint." "Sections from the cutaneous lesions showed the presence of what appeared to be budding blastomycetes." "Pure cultures of the organism were obtained directly from the cutaneous lesions in two places." "Dogs, a sheep and guinea-pigs were successfully inoculated, the most striking results being nodules, grossly simulating tumors, in the lungs. Microscopically these nodules were of a chronic imflammatory nature and contained numerous parasites identical in appearance with those in the patient." In conformity with prevailing nomenclature and for reasons assigned in the article, the parasites were considered blastomycetes or yeast fungi and the disease was named "Blastomycetic Dermatitis."

In the New York Medical Journal, March 26, 1898, H. G. Wells describes at length a third case from the clinic of Prof. Senn at Rush Medical College, which presented many of the same clinical features as Gilchrist's, and, studied by cultures and inoculations, was found to be identical with it.

In June following, at the meeting of the A. M. Association in Denver, Dr. Robert Hessler of Indianapolis presented a paper

before the section in cutaneous medicine and surgery, in which he details an additional case. The patient, a healthy man, received a slight cut while being shaved by a barber. The wound healed in a few days, followed by the development of an oval red papule, small in size, elevated, hard, freely movable, and which remained stationary for three months. It then became inflamed and was opened aseptically. Culture tubes were inoculated and some of the pus was also spread on cover-glasses; no "pus-formers" were found, but a few days later there appeared in the culture tubes growths which subsequently were determined to belong to the yeast family.

Succeeding this came a case of combined syphilis and blastomycetic dermatitis, reported by Hyde, Hektoen and Bevan in the British Journal of Dermatology, 1899, XI., also discussed later in the Journal of Experimental Medicine, Vol. IV., 1899, by Hektoen.

In the Journal of Cutaneous and Genito-Urinary Diseases for January, 1900, Drs. H. G. Anthony and Maximillian Herzog give the history of a case from the clinic of Prof. Henrotin, which seemed also to be one of blastomycetic infection upon a syphilitic gumma. A point of added interest in this case was that the ulceration began with the incision of an abscess which followed an attack of erysipelas twenty years previous.

The most recent case of which I find record is one related by Dr. A. W. Brayton, of Indianapolis, in the Indiana Medical Journal for April, 1900, this with several which I have not mentioned making, I believe, the eleventh to be recorded by observers in this country of this disease named Blastomycetic Dermatitis. No observer has questioned in any of these cases that the infective agent is one of the yeast fungi.

These cases are of interest to the dermatologist and surgeon; to the general practitioner also, since they are likely to be brought first to his notice. They may become of interest to the student of internal medicine, in view of the possibilities suggested by results of inoculation in animals, and of the addition to the list of another chronic infective disease of the pulmonary tissues.

Finally, I wish to give a brief account of three cases not of skin infection, but of throat infection, in one of which at least,

and probably in all, there were none of the ordinary pathogenic bacteria, but only numerous yeast cells in nearly pure culture.

Case I. I was called Saturday, January 29, 1898, to see W. A. Y., whose family consisted of himself, wife and two children—Lena, aged 5, and Maude, aged 10. I obtained this history: Ten days previous the wife had suffered from sore throat, which recovered with the use of domestic remedies in two days. Wednesday night, 12 o'clock, January 26, W. A. Y. awoke with sore throat, intense aching across the back, chilliness, with fever coming on rapidly. Saturday a. m. temperature was 101, pulse 84, some aching still and general bad feeling. The throat showed a dense exudate on the right tonsil, the deposit extending along the margin of the palate to a little distance beyond the uvula, being seen also on the left tonsil to a slight degree. The deposit was grayish in color, firm, not easily removable, leaving an irritable bleeding surface. The sublingual and submaxillary glands were moderately swollen. A provisional diagnosis of diphtheria was made and a culture taken at once. Treatment consisted mainly in the use of tr. ferri. chl. with hydrarg. bichl. internally and a spray of diluted hydrogen dioxide and applications of Loeffler's solution locally. Recovery was gradual, but the exudate seemed prone to return, some persisting for a week. The culture report was negative as to diphtheria.

Case II. Lena, aged 5 years, began to be ill on Monday, January 31, with vomiting, high fever and sore throat. When seen the following morning she had a temperature of 102⅘, pulse 120. Inspection of the throat showed the left tonsil to be covered with a dense grayish exudate; there were some small discrete spots on the right tonsil. Both tonsils were reddened, the redness extending upward on to the arch of the palate on the left side. The exudate corresponded in every particular with the description already given of that in the father's throat. On the same day an eruption appeared, beginning upon the chest and spreading over the body and extremities until forty-eight hours later it appeared more thickly upon the extremities than elsewhere. The rash was small, papular, mostly discrete, elevated, and could be felt under the skin before it showed on the surface. On the second day of her illness there were mild convulsive seizures, which recurred occasionally for a period of three days. The

urine was scanty, and examination showed a high specific gravity and abundant urates, but neither albumen nor casts. The throat exudate increased to form a profuse curdy-looking mass covering both tonsils and extending on the pillars of the fauces, along the margin of the soft palate, following the uvula and down to the opposite side. The posterior pharyngeal wall was nearly covered; there was a deposit at one angle of the mouth, where there had been a crack, and also a small spot on the roof of the mouth. The throat was not painful. There was practically no glandular enlargement. The exudate showed a most persistent tendency under the treatment before mentioned, a little still remaining on the fifteenth day. A culture was made on the first day of her illness with a negative report as to diphtheria. A second culture two or three days later brought the same report. On inquiry concerning what was present, Dr. Wm. C. Mitchell, then serving as city bacteriologist, kindly gave me the following report: There were no Klebs-Loeffler bacilli, no streptococci, no staphylococci, but numerous yeast cells.

Case III. Maude, aged 10 years, was attacked on the eighth or ninth day of her sister's illness with symptoms similar but less severe in type. The eruption was the same in appearance, but more numerous. Unfortunately no culture was made from the throat exudate, but it was in every way identical in appearance with that in the throats of the father and sister. There was scarcely any glandular enlargement.

As moderately free desquamation occurred in the cases of the two children, these will probably be considered cases of scarlatina with an atypical exanthem.

How shall the process in the throats be regarded? What was the infective agent in these cases? Answer will be made that we had to deal with an ordinary scarlatinous angina in two and a tonsillitis in the third.

Unfortunately, not until six months later did I encounter literature suggesting that some of the yeasts might be pathogenic, and I recognize that I am not in position to be dogmatic. A few words, however, will serve to summarize: There were four cases of throat infection, one of which I did not see during its progress; two were accompanied by an exanthem and desquamation, two were not. With this exception, the three cases de-

scribed, viewed from a clinical standpoint, were identical, affording ground for the probability, at least, that in the three cases the throat infection was due to the same microbic agent.

The one studied did not show any of the pathogenic bacteria found in either diphtheria, scarlet fever or other disease affecting the throat, but did show *only* yeast cells in abundance.

Which suggests the question: Was the infective agent in these cases one of the pathogenic yeasts?

DISCUSSION.

Dr. Hickey: My idea, in presenting this case particularly, was that some members of the profession when they meet a case resembling this may take the matter up carefully and do some work upon which we will be able to base something. I recognize that the work in connection with this was somewhat slight, and this was due in large part to the fact that, not accounting the yeast fungi as having any pathogenic power whatever, I thought nothing of it at the time.

FRACTURE OF THE CLAVICLE: A SUPPLEMENTED DESAULT DRESSING.

BY GEORGE W. MIEL, M. D., DENVER, COLO.

The patient's body is washed and the site of injury refreshed with alcohol. A neat fitting cotton or merino undershirt is then put on and left temporarily unbuttoned.

The fracture may now be reduced, a graduated pad, placed between the arm and side, base upward, facilitating; and this pad is to be retained as an important part of the fracture dressing. It is fashioned from two firm and bulky towels (the usual fold as they come from the wash—length, twice width). The inner towel is formed into a graduated compress of three grada-

tions, which, base upward, is included in the other towel, whose ends meet at the apex of the compress, giving additional bulk and a smooth covering. This is placed as high in the axilla as possible, and then by bringing the elbow inward the shoulder is carried outward. Now by elevating the arm at the elbow reduction and adjustment is usually effected without difficulty. With the arm still held at the side against the pad, and the forearm flexed to a right angle, resting easily across the body, the pad is secured by passing three large safety pins in front, and three at the back, from the body to the arm of the shirt, at the same time transfixing the pad. Filling the irregular spaces —front and back—with cotton, the arm is now bound to the side by a spiral bandage descending from the axilla, which should maintain the inward pressure on the elbow and keep the shoulder thrown outward. We can now correct any irregularity remaining, and can maintain position by fixed compresses. Those placed laterally should be about the length and width of the finger and half the thickness, folding firm muslin to these dimensions. They are applied nicely in position, sinking along the sides of the bone. A strip of adhesive plaster of sufficient width and length, crossing, will maintain them and prevent lateral displacement. A flat pad of some eight thicknesses should now cover the lateral compresses and the bone, and this is also fixed by adhesive plaster. The shirt should now be buttoned, and the forearm and hand supported at the wrist with a wide loop of muslin. Increasing the flexion of the forearm slightly from a right angle, the ends of the loop may be secured to the spiral bandage and shirt, or may pass at each side of the neck and fasten at the back.

The usual further turns of the Desault bandage are then applied; turns advancing from without inward—slightly at the neck, and an inch at each turn under the forearm. Under the elbow the turns cover; in making which the shoulder is to be lifted to the desired height. The dressing finishes with a descending spiral bandage, and the various intersections are secured by safety pins.

DISCUSSION.

Dr. Frank Finney: A demonstration of a treatment of fracture of clavicle can not but be of interest to all doctors. I think the doctor's demonstration has shown that he is able to put the fractured clavicle into the position where it will be maintained, and in a position where he will probably get the best results possible. If I were to find any fault with the dressing it would be that possibly the axillary pad used would be too hard and cause too much pressure. However, that is something that must be regulated by the judgment of the surgeon when bringing the elbow down toward the side and making this pad the fulcrum for his lever. It has been my experience that the simpler the dressing for a fractured clavicle, the better. I have treated a number of cases in which nothing but a double triangular surgical dressing—triangular cotton bandage—was used, using one for the supporting and the other for the drawing backward and inward of the elbow, with the most excellent results.

I don't know that the doctor's idea is that this demonstration is anything but a demonstration of the old Desault bandage, which it seems to be.

Dr. Miel: I can remember best what Dr. Finney said last—about the fact that this is the Desault dressing. It is, but it has been supplemented in several ways; first by the lateral pads, which prevent lateral displacement. That is the worst we have in a fracture of the clavicle. Then so far as the shirt is concerned, we need this to give the patient a comfortable covering. It also lessens chance of disarrangement. Then in the matter of slinging the hand, we have a little difference here from the Desault dressing. That is supposed to be taken care of in the turns of the bandage. The Desault pad is made on fixed measurements and is fixed with tapes over the neck. So far as other dressings are concerned, the Sayer dressing is an admirable one if it will accomplish the work, but it becomes offensive to the individual and they want to be released from the dressing. I think you have very much better control of the fracture in this way, and in dealing with a boy especially I should think a dressing of this kind would be found especially applicable.

REPORT ON CLINICAL LABORATORY.

BY A. MANSFIELD HOLMES, M. D., DENVER, COLO.

At the last annual meeting of the Colorado State Medical Socitey the question of establishing a general pathological laboratory was considered at some length.

The necessity for a general laboratory is no longer questioned by progressive physicians. The discussion has resolved itself into a query as to the most available method of establishing such an institution. Progressive medicine owes its success, to a great extent, to the laboratory and its workers. The departments of scientific medicine have become so thoroughly established that a well equipped laboratory is indispensable. Results in serious diseases depend, to a great extent, upon the stage in which the disease is recognized. Frequently the beginning of disease reveals itself in subtle phenomena, which can be recognized only by delicate tests, or by means of instruments of precision. These chemical and microscopical tests require skilled operators and careful technique. Few busy practitioners can spare the time to laboratory technique necessary to make such examinations for themselves. Also, there are few who care to invest in the expensive instruments necessary to make these examinations.

How, then, can the busy practitioner obtain the advantages of a well equipped laboratory without the expenditure of much time, labor, and money? All who have had experience in laboratory work can testify that it is an expensive luxury. A successful laboratory can not be conducted without funds; it must be supported either privately or publicly. The financial problem, therefore, is the great obstacle to the establishment of a general laboratory.

Two plans have already been suggested for the solution of this question:

1st. It has been proposed that the city establish and conduct such a laboratory.

2nd. That the laboratory be established and conducted under the supervision of a medical organization.

There are objections to each of these methods. If such a laboratory be established by the city, the expenses would, of necessity, be borne by the city, and, indirectly, by the people. But the public has a very imperfect idea of the needs or uses of a clinical laboratory. Hence, much objection may be expected against this plan.

If a laboratory should be established by a medical society, it would necessitate heavy expenses, which would require a guarantee of support by the members. I am of the opinion, also, that an effort in this direction would fail.

The plan which I now have the honor to present to the society I believe is a step in the direction of a practical solution of this important problem. This plan consists of uniting the laboratories already existing in Denver. It is proposed that the existing laboratories of Denver could readily be united in such a manner as to include each department of clinical research. By systematically combining the scientific talent of those who are already engaged in laboratory work, each department can be represented by one who is already pursuing his favorite line of research. A general staff of laboratory workers could be selected by this method to embrace bacteriology, pathology, urinalysis, hematology, chemistry, toxicology, skiography, and other branches.

A general laboratory covering this broad field would offer facilities for examination of all body tissues and fluids in the normal or diseased state. Such a laboratory could also be prepared to test water for drinking purposes; test milk, and inspect dairies; fumigate apartments occupied by persons who have had tuberculosis or other contagious diseases; make autopsies, and to furnish reliable reports of all such work. By this method of establishing and conducting a general laboratory each member of the staff will own and conduct his own branch of the laboratory, and will take charge of all work pertaining to his own department. An important feature of this plan is, that physicians will incur no expense in keeping such a laboratory in operation.

The practice of gratuitous laboratory work has prevailed in the past to an alarming extent. This practice should not be en-

couraged. There is no valid reason why the pathologist or bacteriologist should not be compensated for his services, as much so as the surgeon or clinician. To overcome this obstacle a general laboratory should be supported by reasonable fees for the work performed. It is well understood that the laboratory investigators enjoy the pursuit of their work. As much can also be said of the surgeon and clinician. No class of medical men have more arduous labor, or are surrounded by greater dangers to health and life, than those who seek the cause and nature of disease. In proof of this, many examples can be cited in which brilliant investigators have sacrificed their lives for the benefit of medical science.

There are evidently a sufficient number of progressive physicians and surgeons in Colorado and the adjoining states to justify the establishment of a general laboratory. This laboratory should consist of a staff of competent members, prepared to make accurate examinations in all departments of clinical medicine.

ON THE TREATMENT OF TUBERCULOSIS BY SODIUM CINNAMATE.

BY ALFRED MANN, M. D., DENVER, COLO.

Up to the present time there has been brought forward no specific for the treatment of tuberculosis sufficiently successful to command the general approval of medical men. Hopes of the discovery of such an agent have been widely entertained, only to be given up after long and earnest trials.

Of these numerous disappointments many are due to the circumstance that two very important facts are lost sight of, and both of these are connected with the nature of the disease under consideration.

First and foremost is the character of tuberculosis as a disease which actually *destroys* the tissues it involves. In ordinary

croupous pneumonia the lung while inflamed is filled up with products of inflammation, and the portion of lung thus affected is for the time being useless for purposes of respiration. But, after the process is over, resolution sets in, the exudate is liquefied and removed, and the lung is as good as before it became inflamed. Diphtheria, like many others of the acute infectious diseases, causes, as a rule, comparatively slight anatomic changes but is dangerous chiefly through its toxic effects and the complications to which it opens the door. In pulmonary consumption on the other hand, in addition to the necrotic changes so characteristic of the action of the tubercle bacillus, there is an inflammatory reaction of the fixed elements of the tissue and this results in the formation of new connective tissue. It is true this is a conservative process, tending to limit the development of areas of infection. Nevertheless this permanent cicatricial tissue interferes with or actually destroys the functional efficacy of the portion of the lung in which it exists. Thus it becomes largely a question of the extent of the disease process with its inevitable destruction of tissue, and of the fibroid changes necessary for healing, which determines in any particular case the probability of recovery with sufficient lung tissue remaining functionally efficient to sustain life. Furthermore it must be remembered that fibroid changes once started tend to advance into unaffected parts of the lungs and so gradually reduce still further the available healthy lung-area.

This reasoning takes away the basis for the hope entertained by some that a means will be found to cure even the most advanced cases.

The second circumstance that seems to me to be responsible for many disappointments is that an incorrect analogy is drawn between tuberculosis and certain other infectious diseases—for instance, diphtheria and pneumonia. It is argued that if the animal system reacts to these diseases by producing antitoxins capable of neutralizing their toxic effects and which can be recovered in the serum of affected animals and used to immunize or cure other individuals, the same must be true of tuberculosis. But the analogy is not a very strong one. It is probable that the antitoxins which appear in the blood as a result of the reaction of the organism to the irritation of the toxins of diph-

theria and pneumonia, for example, and the immunproteidins of Emmerich and Loew in certain other cases, are the agents which bring it about that so many of the acute infectious diseases are characterized by a marked tendency toward a definite critically limited course. The so-called immunproteidins of Emmerich and Loew, according to these authors, are combinations of bacteriolytic enzymes produced by the bacteria themselves with proteids furnished by the blood or organs of the subject of infection, and effect the cure of the infectious disease and produce immunity by the actual destruction of the specific bacteria. Thus the immunity conferred by an attack of an infectious disease is the result largely of a specific reaction of the organism to the disease, or of products of the activity of the bacteria themselves, and it is by means of this immunity, whatever the physiologic character of its mechanism, aided by the non-specific action of the alexins of Buechner and of the phagocytes of Metschnikow, that the organism is enabled to overcome the disease.

If there is a similar immunizing product of the bacillus and reaction of the organism in the case of tuberculosis, it is certainly nothing like as marked as in the examples quoted above; hence the character of the former as a disease which tends to continue indefinitely and to follow a chronic course.

We have then two important characteristics in which tuberculosis differs from the acute infectious diseases mentioned above: first, it tends to the production of marked and permanent anatomic changes in the organs and tissues involved, and, second, it causes little or no immunizing reaction in the organism.

The observation that micro-organisms often produce substances which, when sufficiently concentrated, interfere with their own development, may yet be turned to account in the treatment of tuberculosis, but up to the present time there is no convincing evidence that an efficient means of treating the disease has been found in this direction. Efforts should not on that account be given up, as a more minute study of the very complex compounds existing in tuberculin may lead to better results than have been achieved in the past.

That there is a strong tendency to spontaneous recovery from tuberculosis is shown by the numerous cases of healed tubercular lesions found in the lungs of persons who have died of

other diseases. Furthermore, many cases of tubercular disease of other organs—notably lymph glands and bones—recover under very simple treatment. The most successful modes of treatment in the past, if we exclude surgical measures, have been those that aimed to improve in every way the general health of the system—those that relied upon the natural tendency of the body to resist and expel infection and that in any way, directly or indirectly, increased its defensive powers. Among these are, first and foremost, the out-door and climatic treatment, the dietetic and hygienic methods, and the treatment in sanatoria.

Besides these general methods there have been proposed numerous remedies supposed to act in one or another definite or indefinite way to attain the same object.

Among these suggested remedies I have selected one in particular for consideration to-day, and that is the sodium cinnamate (or hetol, as he calls it) recommended by Professor Albert Landerer, of Stuttgart, Germany. This author claims, in a series of publications on the subject, the first of which appeared in 1888, to have secured improvement in very many cases and in a large proportion even complete cures. He has published in detail from time to time the histories and results of many hundred cases of surgical and pulmonary tuberculosis treated by his method of intravenous injection of sodium cinnamate solution, including about one hundred and fifty pulmonary cases. A number of others have published results of the use of the same method, most of the writers being apparently favorably impressed with the results of the treatment.

Unfortunately there have been, with the exception of Landerer's own statistics, no large series of cases published. In presenting the results of my own short series, I wish it to be understood that it will not bear comparison with statistics of cases as ordinarily published. My cases were specially selected with reference to certain criteria, which, though permitting to some extent a judgment in regard to the nature and extent of the effects of Landerer's treatment, would give a very unfair estimate of its effects if judged only by results without regard to the class of patients reported upon.

There were two kinds of cases selected for this treatment: First, those with lesions so far advanced and so widely extended,

or with such other unfavorable conditions, that a good result seemed either very doubtful or well nigh impossible; and, second, lighter cases, in which for any reason it was thought necessary to make as rapid progress as possible in a comparatively short time. The first group naturally is the most numerous and yielded by far the poorest results, though, rightly interpreted, some of these results are very encouraging. The reason for treating light or early cases by this method was usually the expected early return of the patients to the unfavorable climate in which the disease was contracted; for as a rule, under favorable circumstances, such cases do very well in this climate under proper direction, and it is not by any means in all cases that I recommend the use of sodium cinnamate.

My cases number altogether fifteen. One of these was a man with generalized surgical tuberculosis in whom the primary focus was in the urogenital apparatus, which was extensively involved and complicated with several suppurating sinuses. This case had secondary foci in the skin of the buttocks, in the sternum and clavicle, and in both lungs, and finally died of tubercular meningitis. The prognosis was absolutely bad when he first came to me.

The remaining fourteen cases are all pulmonary, and none were under treatment less than two months; some of the severe cases are still under treatment. All but two, those classed as light, had daily fever. Four of the fourteen were cases that from the extent and severity of the disease and the presence of large cavities bore a bad prognosis. Yet, of these, one with widespread disease in both lungs and large cavities improved so markedly under the small doses he was able to bear that in two months he looked like a different being. He had put on flesh, his face was fuller, the gray cachectic look had given place to a healthier rosy color, and his cough and expectoration were very much diminished. This man, who only dragged himself about wearily a few steps at a time before the treatment began, at the end of two months, in spite of my directions, took long walks and rode horseback without fatigue. Repeated examination of the lungs showed marked improvement in the physical signs. At this time, for reasons of no consequence in this connection, the treatment was stopped. He continued to feel well for about

a month, all the other conditions of his life remaining the same. Then he began to run down, cough, expectoration and fever grew worse, and he rapidly deteriorated until in four or five months he died, with very large cavities in both lungs.

Whether arrest of the disease might have been secured in this case by continued treatment it is impossible to say; certainly the marked and steady improvement seemed to be due to the sodium cinnamate and did not continue after the influence of this drug stopped, although climate and mode of life remained the same.

In the other three cases of the group classed as hopeless the treatment was instituted merely as a forlorn hope in the late stages and apparently only slightly affected the course of the disease if at all.

Of the two light cases the first was a very early one, with no physical signs but a single click in the left apex, but with plenty of bacilli in the sputum. Under this treatment the sputum rapidly diminished in quantity. An inter-current attack of influenza caused it to increase again, and, though smaller in quantity, it still contained bacilli when the patient left for the East after receiving thirty-seven injections in three months. The weight increased seven pounds in the first nine days, and before he left he had gained twenty-seven pounds, weighing seven pounds more than ever before. Now, fourteen months later, this patient, a dentist, reports that in the course of a few weeks after cessation of the treatment the slight remaining expectoration ceased entirely. He returned to his former place of residence and has been working hard at his profession ever since without a sign of returning trouble, even holding his weight.

The other case classed as light was placed in this group in spite of the fact that there was disease in both lungs, slight infiltration in the left apex, but dulness to the lower border of the third rib on the right side with altered breath sounds some distance below this. In spite of a duration of over a year and a half the disease in the lungs seemed to be stationary and the general health very fair. Fifty injections given in three and one-half months improved all the symptoms so rapidly and to such a degree that nothing was left but a dull area in the right apex; cough and expectoration had disappeared. At this time

the patient returned East looking very much improved, practically well, and weighing 115 pounds—a gain of ten pounds and three pounds more than the highest she ever weighed when well.

In the group I have called severe cases there are several instances which seem to show that the cinnamic acid has a very powerful healing influence, and others in which it is impossible to say whether any effect was produced or not. Of this class there are eight cases.

The first is a man who came to Denver with well-marked trouble in June, 1892. After alternating periods of improvement and deterioration with on the whole a downward course, he began in February, 1894, a series of recrudescences with fever, pleurisy, etc., that occupied the next seven months. During this time there were two copious hemorrhages besides numerous smaller ones. Early in the fall there was an attack of acute pleurisy lasting two to three weeks. Out-door life was persisted in for three or four months and slow improvement was noted. At this time the left lung showed dulness down to the fourth rib and the right to the second rib; there were numerous moist rales over nearly all of the left lung and the larger part of the right. Signs of cavities were detected. There was marked dyspnœa on exertion. The expectorate was practically pure pus and was loaded with tubercle bacilli, though the general condition was decidedly better than it had been three months previously. The prognosis according to two well-known Denver physicians was unfavorable.

At this time, early in February, 1895, intravenous injections of sodium cinnamate were begun. In the first four weeks of the treatment the expectoration became muco-purulent, and at the end of four months great progress had been made, the expectoration containing only a trace of pus and the area occupied by the rales being very markedly less than before. The patient then went one month without injections, and during this time the improvement was very noticeable. He was then given another series of injections for three months, then a rest of six weeks, followed by injections for three months more. The improvement was continuous. By this time his general health was good. There were slight dulness at the right apex, dulness over the

left apex, and dry rales and creaking sounds over the upper lobe. There was then no dyspnoea. Bacilli had gradually disappeared from the sputum and have not been found since. There has been no return of the trouble up to the present time, although four years have elapsed since the cessation of treatment. The patient still resides in Denver.

The second in the group of severe cases was a young woman who, when seventeen years old, had had a slight infiltration at one apex, but was cured by prolonged residence in the South. Several years later, after the birth of her second child, she had a renewal of trouble. Both apices were involved and in addition small areas of infection, probably peribronchial, were detected scattered over nearly the whole right and the larger part of the left lung. Dr. E. G. Janeway, of New York, gave a bad prognosis, In passing, I wish to mention the fact that in this case there were neither cough nor expectoration for two or three years after the illness began. Finally there was a very slight cough with minimal amounts of sputum, which, however, contained tubercle bacilli. Residence in the mountains of Arizona for two and a half years under very favorable circumstances had prevented the condition from growing worse, but had not effected any material improvement. There was a daily rise of temperature to from 99.5° to 100° F.

Eight months of injections resulted in cicatrization of all the areas. Improvement was noted after five weeks of treatment. At present, four and one-half years after cessation of treatment, the patient is apparently as well and strong as ever in her life, only dulness on percussion and bronchial breathing at the apices indicating the location of the scars of the former trouble.

Case three, a woman twenty-six years old, is very similar to the last, except that the condition was not so widespread but more active and with a higher range of temperature. This patient bore only small doses of the drug, but was improving, contrary to expectation, very nicely, when a visit home, followed by permanent removal to a very favorable location in Old Mexico, stopped all progress and she finally, after about a year and a half, died. The duration of her treatment by sodium cinnamate was only two months, yet the improvement was so marked and

so constant that I felt sure of an ultimate good result, when homesickness and financial considerations interfered and stopped the cure so well begun. Her color and general appearance, as well as strength, had improved considerably.

The next case is a man thirty-four years old, small and slender, with a very nervous, excitable disposition and a poor digestion. The area of involvement in the right lung extends down to the fourth rib in front and to one and one-half inches above the inferior angle of the scapula behind. The apex of the left lung is also affected down to the second rib. Bronchial breathing in apices, numerous moist rales in diseased areas as above, dulness marked. Had occasional slight hemorrhages. Eighty-five intravenous injections have resulted in better color and considerable general improvement, though being compelled to earn his living interferes considerably with the regularity of treatment as well as its effect. Patient is not cured, but is as well as he ever was so far as his sensations go, and weighs as much as he ever has done. He still has bacilli in his expectoration, though the latter is very much diminished.

The fifth case of this group is a young woman with widespread and active disease in both lungs, who was improving steadily and gaining weight under this treatment, when it became necessary for her to earn her own living. The bad effect of this work, and two or three severe colds due to exposure, have neutralized the gain, and she is now gradually running down. She had but thirty-nine injections.

The remaining three severe cases have received fifty-one, fifty-six, and ninety-four injections respectively. The first is a bad case in a young man, with the whole right lung invaded. He is compelled to earn his living, and from time to time throughout his illness has had slight and occasionally larger hemorrhages, necessitating interruptions of the treatment. The frequency of the haemoptyses does not seem to be greater than before the use of the hetol. He has improved considerably in strength and general health, and stops work only when he has a hemorrhage.

The next is a case that first attracted attention by causing a very copious hemorrhage. A visit to the East stopped progress, which had begun very nicely with a gain of sixteen pounds

in a month. Just as improvement was beginning again after his Eastern trip, financial trouble was followed by a second trip East, where the patient now is. It is doubtful if he can pull up a third time. He has had altogether fifty-six injections, with several long pauses.

The last case of this group is a tall young woman with a weak heart, and both lungs are widely involved. She has had ninety-four injections with some improvement, though not a marked advance, during about nine months.

In five of these eight severe cases worry about financial affairs or the strain incident to earning a living have been and are retarding factors of such moment that in my judgment they are almost entirely responsible for the very slow and halting improvement. Six of the eight cases would ordinarily have been accorded a very doubtful prognosis.

In reviewing my results it is apparent that the cases are not all affected alike by the treatment. Some very severe cases are rapidly improved; others, apparently no worse, fail to derive any benefit or do so only slowly. Landerer himself, although he definitely and repeatedly disclaims any specific action for the drug, is of the opinion that purely tubercular infections are the only ones directly acted upon. With the material at my command I have been unable to arrive at a conclusion on this point, but so far as my facts go they tend, on the whole, to confirm Landerer's position.

As intimated above the criticism of results reached by any special mode of treatment in the climate of Colorado, so favorable to tubercular cases, is subject to considerable difficulties. Not only the climate enters into the problem, but I have not hesitated in my cases to make use of any of the well-known symptomatic and other remedies that seemed indicated. Along with the hetol I have used tonics freely, such as iron, arsenic and strychnine, as well as expectorants and even creosote. Thus it is impossible to exclude the subjective element in the criticism of results. It is matter of judgment, the result largely of experience, to estimate the probable course in any given case and the extent to which this has been changed by any particular treatment.

Of the worst class of cases, one out of the four apparently received so much benefit from the injections that a very favorable opinion of the action of the drug is justified.

Of the eight cases classed as severe the result has been a lasting cure in two, marked improvement in three, of whom one died about a year and a half after treatment was stopped, and doubtful effects in the remaining three. I repeat, results in five of these cases would in all probability have been much better could the patients have been free from care and worry. In passing, I wish to point out that this indicates one of the reasons for the excellent results of treatment in sanatoria. Furthermore, treatment in two of these cases was stopped when improvement was rapidly going on, and both patients left Denver and did badly—one in a good location in Old Mexico, the other in Pennsylvania.

The treatment I have used in these cases, and am still using, consists of the intravenous injection of solutions of sodium cinnamate or hetol, as it is called, and I have followed very closely in all details the directions given by Prof. Landerer.

Beginning with 1/100-1/50 of a grain, the dose is gradually increased to 1/4 or 1/3 of a grain, which should rarely be exceeded. The injections are repeated every other day. It is very important to use only the perfectly pure preparations, such as are made synthetically by certain German chemical houses.

The technic of the injections is very simple, the main point being to secure perfect asepsis. The hands of the operator, the skin about the point of the injection, and the instruments should all be carefully sterilized. Usually the median basilic or cephalic vein in one or the other arm is selected for the operation. By encircling the arm some distance above the elbow by an elastic bandage the vein is rendered prominent and its walls become tense. The needle is then plunged slantingly through the skin and wall of the vein at once. If immediately after the injection and before withdrawing the needle the bandage is loosened and the arm raised up, there is not a drop of blood, as a rule, when the needle is drawn out. The skin about the point of injection is rubbed with ether, then with alcohol. The needle, the point of which should be fine and kept well polished, and which ought to be used for no other purpose, is placed in strong alcohol for

twenty minutes before and after using, and the same liquid should be forced through it. Boiling can then be dispensed with, which is an advantage, as it corrodes the point and causes it to pass through the tissues less easily. I have made use of this technic in over 800 injections and have never had the slightest local infection. Indeed in one of my cases over 100 injections were made in a single spot less than half an inch square without a trace of visible effect remaining. An aseptic dressing should be kept over the site of the puncture for a few hours.

The duration of treatment naturally varies considerably. Light cases and those with a purely tubercular infection require a very much shorter period of treatment and furnish a much larger proportion of favorable results than patients with widespread disease, fever, cavities and multiple infections. I have excluded from this report all cases in which treatment extended over less than two months. The number of injections varied from twenty-five in two months to one hundred and eight in a little over a year. Undoubtedly this treatment would yield much better results if it could be administered to patients living under the careful regime of a well-conducted sanatorium with facilities for the strict carrying out of the rest and out-door plan of treatment. Such an institution is the sanatorium Krähenbad in the Black Forest, directed by Professor Landerer, and remarkable results are reported in the treatment of tubercular cases.

The long series of experiments and investigations that led finally to the method that Landerer uses at present were begun immediately after the discovery of the tubercle bacillus by Koch in 1882. His first monograph on the treatment was published in 1892. For years the method was neglected, but of late it has been commanding more attention because of the unusually good results it has yielded.

The considerations which formed the point of departure in his reasoning were the following: So long as the changes in the tissues caused by an infective agent or its products do not progress beyond the stages of inflammatory hyperaemia or serous exudation, complete restitution to the normal condition is possible. More severe processes which result in actual destruction of tissue—necrosis—are not capable of being followed by

a return to normal, and here the most favorable conclusion is the formation of a scar.

The lesions of tuberculosis in the vast majority of cases with which we have to deal belong to the latter category, and the object of treatment is to convert tuberculous tissues into solid scars. Now, Landerer says, it is well known that tuberculous areas have comparatively little tendency to become scarred up; in the vast majority of cases they show a tendency to be progressive, to form chronic abscesses, fistulous ulcerations, cavities, etc. He attributes this characteristic to the very moderate inflammatory reaction in and about tuberculous areas, and points for confirmation to the marked scarcity of blood-vessels in them. There is too little blood present and hence too little material for processes of repair—for the formation of the scar.

This gives us the problem—to artificially provoke a more active inflammation about the areas. The treatment of lupus and slow-healing ulcers by caustics or ignipuncture is based on exactly the same principle.

Landerer now considered the fact that internal areas which are inaccessible from without can be reached by means of the blood current, and further remembered that foreign particles injected into the blood are taken up by the white corpuscles and deposited by preference in regions where an inflammation or injury is present. He experimented on rabbits with an emulsion of balsam of Peru, and found not only that after intravenous injections numerous white corpuscles carrying fine globules of the balsam closely surrounded the tuberculous foci in the lungs, but that there was an evident beneficial influence on the course of the infection.

Without repeating the details of his years of careful experimental research, it will suffice to say that cinnamic acid was found to be the efficient constituent of balsam of Peru; and at present the compound used for intravenous injection is the sodium salt of this acid, called hetol. It possesses all the efficacy of the original balsam and is free from its defects.

Landerer in his writings goes very fully into the consideration of the mode of action of hetol and his theory of the same. In the following I give an outline of the observed facts as published by him and corroborated by several other investigators.

In the first place he has determined by experiment upon animals as well as human beings that the injections are entirely harmless. There are no bad effects to the kidneys, and careful blood counts show that there is no diminution of the red corpuscles; even excessive doses cause no discoverable injury to any organ.

The first effect to be noticed after the intravenous injection of hetol solution is an increase in the number of white corpuscles, chiefly confined to the multinuclear neutrophiles and the eosinophiles. This increase begins within an hour after the injection and reaches its maximum in from three to eight hours, the number being doubled or more than doubled. After this a gradual decrease is observed until in from twenty-four to forty-eight hours the normal is reached. The capillaries about the diseased areas become dilated and crowded with leucocytes, which emigrate in numbers and begin to gather about the tuberculous foci, forming a dense wall. This on section can easily be seen with the naked eye.

In a few weeks new blood vessels spring up and the granulations extend into the substance of the tubercular area, gradually absorbing and replacing the necrotic material of which it is composed. Finally this new granulation tissue, as in normal healing, is converted into a scar. Small cavities are probably entirely obliterated; large ones are surrounded by dense connective tissue, with a smooth, dry lining of the same. The whole process may be summed up by saying that the treatment substitutes an active, aseptic inflammation for an inactive one, and the result is rapid cicatrization. The sensations of the patient undergoing this treatment are those of increased well-being commonly observed in persons improving under general hygienic and climatic treatment, except that the favorable signs appear more quickly.

Whether the increased activity in the healing process, which has been carefully followed step by step in rabbits, is due to the presence of the numerous leucocytes, is as yet impossible to say. It is conceivable, as Landerer suggests, that hetol acts on tuberculous processes by forming innocuous compounds with the toxins of the tubercle bacillus. This is a subject that cannot at present be cleared up.

There are several side-effects of the sodium cinnamate treatment that are worthy of mention, partly because of their extremely interesting bearing on the question of the origin of uric acid in the blood.

In a recent address by Professor Ewald before the Medical Society of Berlin, in which he presented at length a report of his use of sodium cinnamate, he called attention to a marked drowsiness that he observed in many of the patients undergoing this treatment. Landerer stated that he had not observed this symptom, and thought that perhaps Ewald's doses had been too large. I have noticed this symptom in quite a number of my patients, and can produce it at will by increasing the size of the dose. It does not appear until ten or twelve hours after the injection, and usually with moderate dosage disappears in twenty-four to thirty hours. I think it indicates a dose that is rather too large, and it corresponds in the time of its occurrence with the period of diminution in the number of leucocytes in the blood and the probable destruction of many of them. The sensation is exactly the same as the so-called uric-acid fatigue, and according to Horbaczewski's theory of the formation of uric acid from the nucleins of broken-down leucocytes, its pathogenesis would be comprehensible. A number of the patients noticed and reported to me that they slept very soundly and long while they were taking the injections, more so than usual, and one found it harder to sleep each time the injections were stopped for a period.

In several patients there occurred repeated attacks of acute muscular rheumatism, which were absent during the long intervals of treatment and seemed to have a relation with the injections, due perhaps to the same chain of causes as the drowsiness. In one patient with chronic gout the affected joints became painful two or three weeks after treatment was begun on more than one occasion.

Generous doses, especially in severe and febrile cases, are apt to be followed within twenty-four hours by a slight rise in temperature. In my experience it has usually not exceeded a degree or a degree and a half, but by keeping accurate records of the daily temperature curve it could be very plainly made out in several cases.

In my cases I have not noticed any decided tendency in the drug to cause hemorrhages. The moderate inflammatory hyper-

aemia observed in Landerer's experiments would lead one to expect small leakages of blood, but I have not observed these or larger bleedings except in cases that had been having them before the treatment was begun.

While I am a firm believer in the great value of an out-of-door life, in rest, and in the advantages, undoubtedly very considerable, of certain climates, especially the high and dry ones, in the treatment of patients with tuberculosis, still I recognize the fact that in many cases all these means are not enough and we want every possible help we can get in addition.

My experience with sodium cinnamate in the treatment of consumption has given me favorable impressions of its effects. I think I have had evidence, good evidence, that it will quicken to a marked extent the healing processes when they are sluggish or altogether inactive in some, though not in all, of the cases. Most of my experience in its use has been with rather severe cases, and the art of prognosis is here proverbially difficult; yet it seems to me that the results have been very encouraging—that is, better than they would have been without it—and I shall continue to use it in addition to the other good methods that are available and that ought not to be neglected in any case.

DISCUSSION.

Dr. Chas. Denison: Mr. President, I have very little to say, for I was not aware that I was to introduce this discussion until I saw my name on the program, and perhaps I am the wrong one to be chosen because I have not had any particular experience with this remedy. Yet I have known that Landerer's experiments were repeated by Emery, and he did not come to the same conclusion that Landerer himself did, making an unfavorable report, and his repetition of the experiment was about one year afterwards. Dr. Mann, it seems to me, concludes rightly that the remedy can not be a specific; though in connection with the clinical results, since the article enters into tuberculous tis- it seems to me it would have some effect. It certainly is not a specific any more than any other tonic.

Dr. Mann: I do not claim that the method is a specific method of treating tuberculosis, and yet there are one or two

facts that point in that direction. The drug has apparently no effect in—it apparently does not influence—any except tubercular diseases. It has been carefully experimented with and it looks as though there is some relation between the drug and the disease. What it is, is still to be discovered. Possibly the cinnamic acid forms some compound with the toxins of the disease.

There is one point I wish to state, and that is that the treatment is rather troublesome. It takes a good deal of time, and the patients very often begin the treatment, but will not continue it to a conclusion; that makes the statistics very unsatisfactory. For one case that we finish, we have five or six that are not finished, and we are often left with nothing but a guess in regard to the effect of the drug.

THE LOCAL USE OF GUAIACOL IN THE TREATMENT OF FREQUENT, PAINFUL URINATION.

BY JESSE HAWES, M. D., GREELEY, COLO.

I wish to present a remedy for the treatment of painful urination, which, so far as I am aware, has not been mentioned in the therapeutics of this annoying disorder.

Frequent urination is a symptom of various affections. It is enough to mention, as its causes, disorders of the general system, disease of organs neighboring to the genito-urinary, and diseases of most any part of the genito-urinary system itself.

Guaiacol is only applicable to those cases in which the cause of the symptom is located in the extreme inner portion of the urethra, usually in a space three-fourths to one and one-fourth inches external to the urethro-vesical orifice. There are many diseases of the genito-urinary system that cause urgent micturition, yet it is probable that all other causes combined furnish fewer cases of frequent painful urination than the one condition

under consideration. Disease of the deep urethra is, I believe, usually mistaken by the majority of general practitioners for "cystitis" or "irritable bladder." I am quite sure that nearly all the cases which years ago I called "cystitis" and "irritable bladder" were not such. I suspect that most of the cases treated with buchu, rhus aromatica, uva ursi, belladonna, etc., and called cystitis, should be called disease of the deep urethra and treated locally.

The morbid condition is usually confined to the mucous membrane and submucous tissues. In almost all cases there is a heightened color of the mucous membrane; the color varies between a rose or pink and slight purple—some cases present a granular surface. The diseased part will often bleed on touch.

There may be, and usually is, some uneasiness about the base of the bladder, and when the desire to urinate is decidedly present the discomfort is marked, nagging, and exceedingly uncomfortable. It is only necessary to place the positive physical signs and symptoms of cystitis, diseases of the prostate and kidneys, gonorrhoea, contracted and adherent prepuce, stricture of the urethra, etc., in contrast with the physical signs of inflammation of the deep urethra to put the physician upon his guard against confusing these diseases. I have called attention thus briefly to some of the symptoms and signs of deep urethritis to emphasize the fact that it is often mistaken for other diseases.

The diagnosis having been settled, an ordinary urethral speculum of a caliber as large as can be borne with comfort should be passed down through the deep urethra. With absorbent cotton on a cotton-carrier the mucus at the bottom of the speculum should be taken up. If any blood has filled the lumen of the speculum it should be mopped away until the mucous membrane is dry. Another carrier having a small ovoid of cotton on its point nearly saturated with guaiacol may be used to make applications to the congested membrane.

Guaiacol in a fluid condition should not be permitted to cover the mucous membrane; barely enough to make a surface application is all that is desirable, and thus applied it is an anaesthetic and mild stimulant. It gives rise to much less pain than the usual local applications. It does not give rise to strangury as silver nitrate usually does. The patient will often re-

tain the urine for hours after the application. Its use is often followed by a lessening of the perineal and suprapubic discomfort after a few hours, and a few applications, from five to ten days apart, in my experience has been more satisfactory to patient and physician than any remedy previously used. For me it has *cured* 20 per cent. of the cases. Most cases are improved markedly; these will amount to 70 per cent. Some cases that would seem to fall fairly within our field are not improved; these may be 10 per cent. If applied every day or two it will produce local tumefaction, causing a diminished size of the urinary stream; this tumefaction passes away in a few days.

The application will not cure frequent and painful urination due to an enlarged prostate, but in so far as a congested prostatic urethra accompanying prostatitis is a factor in enuresis, the application of this agent is indicated. There are a score of other diseases that cause enuresis which will not be improved by this treatment.

I append a few cases illustrating its effects. No description of the morbid condition in these cases will be given, as all come within the bounds previously described:

Case 1. A. W., male, age 40 years, had gonorrhoea fifteen years ago, and has always since then had an "irritable bladder;" has suffered many things from many doctors. When he consulted me the chief cause of complaint was the perineal discomfort and the annoyance of being compelled to void urine on very short notice. He remarked: "I may be talking on important business with an acquaintance on the street. I receive a notice from my bladder that it must be emptied *immediately*. The order is imperative; it admits of no argument; it must be obeyed at once, or I must go home and change my wet under-garments." He was compelled to pass urine two or three times each night, and frequently during the day. Four applications, a week apart, made him nearly well. He comes to me about once in six or ten months for two or three local treatments, and is kept much more comfortable by them.

Case 2. M. E., a girl 10 years old; since babyhood has been obliged to pass urine very often. In the past three years has got up on an average of six times a night, and passes urine ten or twelve times a day. One local application reduced the noc-

turnal number to four times a night; the second application reduced it to two times; the third and fourth gave improvement, a whole night being passed sometimes without disturbance of sleep. Although the patient was not fully cured, she has failed to continue treatment.

Case 3. Mrs. L. T., a widow, age 72 years, since 1898 has averaged getting up to pass urine five times a night. Three local applications has reduced the number to about two. This improvement has continued for four months without other attentions.

Case 4. Mrs. F. J., married, age 50 years, has passed urine four or five times a night for many years, and frequently during the day. Medicines by month preferred by patient until it was evident to her that she obtained no benefit therefrom. Local treatment with guaiacol five times in five weeks restored the micturitions to normal number. Patient has been in normal condition for a year.

Case 5. D. J., male, age 28 years, had gonorrhoea one year previous to treatment—was confined to his bed one week with orchitis. During the year before treatment, after all gonorrhoeal discharge had ceased, he had a constant weight in perineum and above bladder, with very frequent urination; nocturnal enuresis occurred about three times a night. One thorough application was made; that night he urinated once only, and in six months since then has been perfectly normal. The perineal and suprapubic pain has entirely ceased.

Case 6. Mrs. P. J., age 28 years, has had an "irritable bladder" since childhood. For twenty years at least has passed urine ten to fifteen times a day and three to five times a night during all of that time. She said: "When I go to visit an acquaintance, or attend an evening party, my first concern is to locate the water-closet." An examination showed the typical condition described above. A topical application was made at once—that night she passed urine but once for the first time in her recollection. She has never been obliged to get up in the night since that date, and urinates only four or five times a day. As the urethra was a little abnormal I made a second application, ten days after the first.

DISCUSSION.

Dr. Will B. Davis: Mr. President, I have never used guaiacol as the paper suggests, but, with my experience with it in other fields, I do not doubt but its use as advocated by Dr. Hawes would prove beneficial.

To be clear in your diagnosis—a point which the doctor emphasizes—is of especial importance here. Tuberculosis of the prostate as well as malignant growths of the bladder and neck, calculi, etc., may produce frequent dysurias similar to those due to a deep urethritis. Instrumentation in any of these would be more likely to aggravate the distressing symptoms.

Regarding the irritation of the deep urethra in the class of cases to which the paper refers, the doctor, I think, is correct in stating that it is within the first three-fourths inch; but the bladder surface immediately surrounding the urethral exit is also frequently involved, constituting the so-called cystitis of the neck.

I have never encountered any difficulty in relieving frequent dysurias due solely to a deep urethritis, or simple cystitis of the neck, whether of gonorrhoeal or other parentage, including two cases I well remember which were claimed to be due to some nostrum or other that was supposed to contain turpentine. Anyhow they were not of gonorrhoeal origin—one being of three and the other of six weeks' duration when coming to me.

In this class of cases I have found deep injections of nitrate of silver—using a Keys or Ultzmann syringe—to prove always successful, in strengths of from one-half to ten grains to the ounce, beginning with the weaker solutions and going up gradually, the behavior of each case being its own guide as to the particular strength to be continued. Making an allowance of one or two hours' irritation following this treatment, relief is practically immediate—patients who had been urinating every fifteen to thirty minutes for days and weeks having entire relief and being enabled to sleep seven to eight hours without rising to urinate. This is not an account of one or two or three or four cases, but scores of them. What more could be wished?

I should be wary of using any local applications in the onset of these troubles, at least for the first few days; preferring to prepare the patient for urethral instrumentation by the use of

some one of the internal remedies which have been found to avert disagreeable complications from operative interference with the bladder and urethra.

Now as to the doctor's treatment. I understood him to say that he introduced a urethroscope, and through it made his applications. I don't think that is good practice. I do not think endoscoping the deep urethra ought to be done very frequently. I do not think the urethroscope ought to be introduced into the deep urethra excepting in some few instances for diagnostic purposes. As a routine treatment I think you are liable to get more damage by its introduction than benefit from any application made through it. Then the necessity for it does not exist. A deep urethral injector is the instrument to be used in these cases. It is rather irritating to introduce a straight instrument into the deep urethra when healthy, and all avoidable irritations should be eschewed when dealing with an inflamed organ. The more I practice genito-urinary surgery, the less I use the urethral endoscope.

Were I to use guaiacol—which, after hearing Dr. Hawes' paper, I think I shall try in some cases of tuberculosis of the prostate—I would apply it with a deep urethral injector—a curved instrument, made especially for deep urethral work.

Dr. Hawes: One of the first questions asked me as I sat down was: "Will this be applicable to tuberculous cystitis?" Of course I do not expect a person listening to a paper the contents of which he is unfamiliar with to grapple all its points, but I think a mere cursory reading of the paper will show that there is no claim of that—in fact there is an entire disclaimer of its benefit in cystitis. The disease that is under discussion as to treatment must be located in the deep urethra.

Dr. Davis objects to the use of this in the acute stage of any inflammation. We use guaiacol in the treatment of acute tonsillitis, with some comfort I think—more comfort than anything else; indeed, it was the use of guaiacol in acute tonsillitis that suggested to me the use of the same remedy in this trouble. I have seen quite a good deal of the results from the use of nitrate of silver. It is without doubt a valuable agent—it was the most valuable agent we had for quite a number of years. I have no doubt there will be a class of cases that will be amenable to

nitrate of silver that will not be amenable to the treatment of guaiacol, but the strangury is obviated by the use of this treatment.

I have seen patients after treatment by silver nitrate going to their homes passing water almost constantly, and I used to recommend such patients to wear a rubber condom so they would not wet their underclothing. They could, by using a rubber receptacle, go home and not render themselves odorous or uncomfortable, or subject to remarks by those who were near by. One speaker says: "Don't use the urethroscope." Now, if you refer to a large urethroscope—one which you must *force* through the deep urethra—don't use it in those cases. But I have passed a small one through a large prostate a good many times without creating any disturbance. The instrument must be sufficiently small to pass with gentleness. There are some deep urethras that can not be entered to the extreme end, but the majority of the cases will permit an examination of the deep urethra to its back part, just posterior to the prostate gland.

I think more than half of the cases I used to treat as cystitis I would not call cystitis now, but, rather, deep urethritis, and when I am getting such results from guaiacol locally I am better satisfied with it than with remedies taken internally that produce their effects after having passed through the circulation. I would not exchange it in the majority of cases if I had any regard for the comfort of my patients or the quickness with which they are relieved. I would strongly recommend the use of the article I have written upon.

I forgot to comment upon the statement of Dr. Davis in regard to the use of the urethral syringe. Now, by the use of saturated cotton nothing is left there except what you press against the membrane—the mucous membrane. You will make your application direct to the part affected and nothing else. If you inject a dozen drops of any liquid into the deep urethra you are quite likely to have your medicine applied to a lot of membrane that is not diseased. That is why I would not use the syringe. The objection is, you are making an application to membrane that is not diseased and it is not applicable.

Dr. W. P. Munn: I owe Dr. Hawes and the society an apology for not having been here on time. Since Dr. Hawes sug-

gested the use of guaiacol in the treatment of deep urethritis last year, I had kept the matter in mind, but have not attempted to use it until recently. Within the past month I have had an opportunity to use it on three or four cases, and desire to add my testimony to his in reference to, first, the comfort with which patients bear an application of guaiacol to the deep urethra when made through the urethroscope. It is in marked contrast to the use of anything like an equally strong solution of nitrate of silver in the same manner. Second, I can say from my observation of the three cases that in each instance there has been, so far as the matter of painful urination is concerned, benefit; and, third, I have to say that in none of the cases have I noticed an absolute cure. That is for the reason that I have not used it a sufficient number of times, nor have I carried on the application as systematically as it should be carried on. One case which has been refractory to all other methods—the trouble being a sequel of old gonorrhoea—has been much more benefited by the use of guaiacol than by the previous treatments by nitrate of silver, protargol, or some other remedies. One other case in which chronic prostatitis existed has been very markedly benefited by two or three applications of the guaiacol through the urethroscope, and I see no reason to doubt he is on the highway to a speedy cure. The remedy seems so promising that there is great justification in giving it an extended trial in all these cases.

I think we ought to insist that the most rational treatment of the deep urethra is that by means of the urethroscope, and he who undertakes to make an investigation of any case of frequent urination without the urethroscope has failed to make the investigation as thorough as it should be made.

A PRELIMINARY NOTE ON THE RELATION OF THE FORM OF THE TUBERCLE BACILLUS TO THE CLINICAL ASPECTS OF PULMONARY TUBERCULOSIS.

BY HENRY SEWALL, PH. D., M. D.

In September of 1889, having been forced to seek the Adirondacks to prevent a physical collapse, I gave some attention to a problem which had previously been suggested to me by Dr. Welch, of Johns Hopkins University. It was to determine whether any relation exists between the characters of the tubercle bacillus, its staining reactions and varieties of form, and the clinical symptoms of pulmonary disease. The work was done under exceptional advantages at the Adirondack Cottage Sanitarium, where from first to last more than seventy patients were the subject of inquiry. A summary of results was published in the Medical News July 25, 1891. The investigation proceeded from two directions: first, pure cultures of tubercle bacilli were studied as to their form and staining qualities; second, tuberculous patients under observation were divided into arbitrary groups according as their clinical signs and symptoms seemed to enable one to discriminate between, *a*, those who were recovering; *b*, those who were simply holding their own, and, *c*, those who were manifestly failing.

The sputa of all these individuals were carefully examined and the tubercle bacilli found therein were compared as to form and in some cases as to their staining properties.

The pure cultures of tubercle bacilli consisted of tubes kindly furnished me by Drs. Councilman and Abbott of Johns Hopkins, Drs. Vaughan and Novy of Ann Arbor, and Dr. Trudeau, director of the Adirondack Sanitarium.

All the cultures were old and probably, as will be assumed, of low virulence except one furnished by Dr. Trudeau, which was new and the infective power of which had recently been found to be very great. The conclusiveness of this phase of my work

suffered greatly from the lack of facilities to incubate new cultures on various media and to test their virulence by inoculation.

It is now a matter of elementary knowledge that the tubercle bacillus is distinguished from most other microbes by the fact that, after being stained with an aniline dye, it resists decolorization by acids much longer than most bacteria. The relation of the bacilli to stain was tested in the following way: cover slip preparations were made from the various cultures, and they were stained for a definite time in carbol-fuchsin. The slips were placed on the microscope stage upon a specially prepared slide permitting active irrigation with fluid without movement of the specimen. When a stream of very dilute nitric acid was allowed to flow under the preparation, the smear quickly lost its color, but the retention of color on the part of the bacilli from the fresh, virulent culture was perceptibly longer than in the case of those from the old and presumably non-virulent cultures. That is to say, the virulent bacilli resist decolorization longer than the non-virulent. If the acid has not remained too long in contact with the specimen, its removal by a stream of water is followed by a return of color, and this alternation of reactions can be produced a number of times.

But, as in the first case, the final decolorization of the virulent bacilli required a more prolonged action of the acid than did that of the other forms. As these observations were repeated day after day the difference in resistance to the action of acids exhibited by the various cultures gradually diminished. It is a plausible assumption that the virulent culture, exposed to the diffused light of the laboratory, little by little lost its toxic power and with it the tenacious hold upon the aniline dye. I made no extended observations on the morphology of the bacilli found in pure cultures, but it is worth recording that the forms found in the virulent culture were uniformly like those presently to be described as characteristic in the sputa of rapidly failing cases of tuberculosis, while in the non-virulent cultures the bacilli presented the features preponderating in the expectoration of "good" clinical cases. It is hardly necessary to say that the tubercle bacillus, while a very distinctive organism to the trained eye, presents much variety in its appearance. The length of the

bacillus is said to vary from one-quarter to three-quarters of the diameter of a human red blood corpuscle, the thickness being one-fifth to one-sixth of the length.

When studied in sputum, tubercle bacilli appear to me to present the following well marked varieties of form, with more or less complete gradations between: 1, a very short, relatively broad rod; 2, a long form represented by a chain of rods; 3, a long form homogeneous in structure; 4, a long form of a beaded appearance as if composed of a string of spores. Many investigators have described a branching variety of the tubercle bacillus which some have regarded as a result of degenerative growth, others as the sign of its relation to higher biological species. The occurrence of such departures from type are not likely to attract the average observer. That a definite species of bacteria may appear under widely different forms has been abundantly demonstrated, Westbrook having recently analyzed the varieties of the diphtheria bacillus and Adami shown that the colon bacillus may appear as a diplococcus.

It seems to be the common belief that the composition of the culture medium and the conditions of growth as to supply of oxygen, heat and moisture have much or all to do with this morphological diversity. A difference in the toxic virulence of the various forms is only suspected.

The present paper makes no pretence of presenting explanations of facts, but is limited in its scope to the practical question, Does the form of the tubercle bacillus as found in the sputa have any relation to the physiological condition of the patient? In the clinical classification of patients I made in the Adirondacks I was impressed with the fact that the failing cases with active destruction of lung tissue produced sputa characterized by a preponderance of the shortest rod-like forms of bacilli. In cases that were doing well the short and jointed germs were few or wanting, the prevailing forms being slender, homogeneous rods of greater or less length, the substance often being broken into spore-like droplets. While in old chronic cases where there had been a great loss of tissue but in which the disease had been fairly well arrested, or in which the malady had made such extensive havoc that the maintenance of life itself was a demonstration of the low virulence of the infecting organism, the

bacilli were long and beaded. A few observations were made to test the resistance exhibited by these different forms to decolorization by acids. This difficult subject was not sufficiently explored to support definite conclusions, but so far as the observations went it appeared that the short rods held their color longer under the action of acids than did the other forms.

To-day I am strengthened in the opinion formed nearly eleven years ago that the form of the tubercle bacillus, as it is demonstrated in the sputum, is an important indication of the virulence of the tubercular process, and as a corollary I will venture to suggest that it is a useful guide to prognosis. It is a truism to say that the tubercle bacillus is always dangerous and may always be deadly. Most of those who were classed as "good cases" in my Adirondack list are long since under ground. As practical physicians we are familiar with the enormous influence of habits and environment upon the well-being of the tuberculous subject. Yet we are continually facing anew the strange fact that of two consumptives, both in similar physical condition, with apparently equal chances for recovery, one progressively gets well but the other gradually slips backward, here a little, there a little, until no hope remains. Again, in the temporary physical backsets to which every tuberculous subject is liable, one case recovers perfectly as from a passing indisposition, but another rises broken and permanently hurt. It has seemed to me that the form of the bacilli found in the sputa has great significance in the discrimination of these classes of cases one from the other.

The short, deeply staining rod or chain of rods has fearful import. A rather thick, well staining, homogeneous rod of moderate length is the usual form in many active cases. The long rods, particularly if irregularly broken, betoken a milder process, and the chains of sporelike beads characterize the very chronic cases which make us wonder at their tenacious hold on life. If there be a *good* form of the tubercle bacillus it is, as seems to me, a rather long, slender rod, ill-staining or staining irregularly as if the body of the microbe were irregularly corroded on the sides. It is found in cases apparently passing on to cure. Sputa of the same individuals examined month after month have seemed to me to vary in their bacillary characters with the state of the patient as regards the disease.

The physical, chemical and vital factors determining the form of the tubercle bacillus in the sputum must be of great complexity, and any attempt to strictly differentiate the forms according to their pathological value would meet with failure. Still the practical problems of tuberculosis are so all-important that no apology need be presented for taking up any line of research that offers the least hope of leading to an increase of our knowledge.

DISCUSSION.

Dr. E. C. Hill: I would like to say a few words on this paper of Dr. Sewall's. It is certainly a very interesting subject. Perhaps the reason of the difference in the staining properties of tubercle bacilli is due in part to the relative amount of fatty or waxy material in the capsule of the germ. The older and longer types may be somewhat disintegrated externally and hence allow the ingress and egress of the staining fluid with greater ease. While the paper is suggestive, the points observed seem to me of minor importance as compared with clinical indications.

Dr. W. N. Beggs: I have been very much interested in the paper because it presents a portion of a subject which has attracted my attention for more or less of the time. I must say I don't think I can agree with the conclusions drawn by the writer. As to these variations there is no question, but as to the interpretation that can be placed upon them I think there is very great room for doubt. I have for some time had the idea that the length of the bacillus was an indication of the rapidity of its proliferation; that the longer the bacillus the less rapid its growth, the shorter the bacillus the more rapid its multiplication. This, however, is not necessarily any indication as to the degree of virulence. We are not justified in asserting that rapidity of growth means a great degree of virulence. Indeed, we know that in the case of some micro-organisms, for example the streptococcus, the very reverse is the case. In the case of this germ it is a well known fact that those cultures with a high degree of saprophytic luxuriance have a very low degree of virulence, and vice versa. Thus we are not justified in concluding that a rapidly growing bacillus is necessarily a virulent one.

But as to the difference in the long forms—those which stain uniformly and those which do not—we can draw conclusions there, because I have had in my possession specimens which originally when mounted, and of course dead, were those which corresponded to the long uniformly stained, but in the gradual process of fading away, which they are subject to, they have gone through the various forms of irregular stain until finally they have disappeared.

Now, we can not always follow out the clinical history of our case, and I bear in mind very distinctly one case in which, in repeated examinations made between four and five years ago, in all the specimens examined an overwhelming proportion of the tubercle bacilli were of the distinctly short form, and they were present in great numbers. That patient was not in such condition at that time as to give a bad clinical diagnosis, and that patient to-day is not any worse apparently than four and a half or five years ago. Now, a positive observation is of some value. The tubercle bacilli were exceedingly numerous; all short and comparatively broad and uniformly and intensely stained. I have had too many instances in which the sputum has been submitted for examination in which the characteristics of the bacilli vary within a short time for me to accept these things as at all conclusive at the present time.

Dr. Sewall: It is a sign of critical discernment on the part of a medical body when a paper presented before it is not swallowed whole, and I am obliged to the gentlemen who have attacked my conclusions.

It was my effort to present a plain statement of alleged facts, carefully avoiding the theoretical considerations which might be supposed to explain them. My critics have not altogether distinguished between fact and hypothesis. I have not touched upon the chemical basis of the peculiar staining reactions of the tubercle bacillus. I have not hinted at the relation between the rate of proliferation and the form of the bacilli, and no line of argument such as that adopted by Dr. Beggs is capable of leading to light upon the subject.

The question at issue is one of fact and may be simply stated: Does the form of the tubercle bacilli found in the sputa vary in any definite way with the clinical condition of the pa-

tient? Knowing as we do that of two consumptive patients apparently in the same physical condition, and remaining under the same environment, one may recover while the other dies; we must suppose that the difference between these patients lies in the smaller ratio of vital resistance to bacillary virulence in the one as compared with the other.

My observations indicate that the patient of low relative resistance is distinguished by bacilli of the short rod form while the other expectorates chiefly the longer varieties, though both patients may seem to have equal chance in prognosis. If such an aid to clinical work, supposing the facts established, is not of value, I do not know what constitutes scientific value.

As pulmonary tuberculosis is usually sooner or later associated with a secondary infection, the virulence of this process tends probably to interfere with any parallelism between the characters of the tubercle bacilli and the clinical state of their human host.

DIABETES MELLITUS: REPORT OF CASES.

BY R. F. GRAHAM, M. D., GREELEY, COLO.

When Mrs. B. became aware that she had diabetes, twenty years ago, she was drinking from ten to twenty quarts of water daily. Five years later she was bedfast for a year, became greatly emaciated, and was not expected to live. She bore a child at this time and gradually improved, and bore two children later. She has been well and strong for ten years and weighs 165 pounds. She drinks eight quarts of water daily and has an abundance of sugar in her urine. Her brother died in a Pittsburg hospital at 25 years from diabetes mellitus after a four years' illness. He drank ten quarts of water daily. This information was obtained three years ago direct from Mrs. B. in answer to a letter of inquiry written at my request. A year

later I had the opportunity of examining Mrs. B. She was in vigorous health; age 48; menopause three years ago; eats a general diet. She passes ten pints of urine in twenty-four hours, colorless, sp. gr. 1006, acid, no albumin, no sugar. Two years still later her daughter reports her as drinking ten quarts of water during the night and in very poor health.

My patient, Mrs. W., daughter of Mrs. B., age 28, was always healthy until 18 years of age, when she thinks her diabetes began with diarrhoea, although she was not aware of sugar in her urine until two years later. This diarrhoea has continued with only brief intervals of relief until the present time, sometimes having as many as twenty stools daily. About the time sugar was discovered in her urine, at age 20, she came to Colorado and married and is the mother of three vigorous children. Her urine during these eight years has never been increased in amount, specific gravity always ranging around normal, and at all times contained about one per cent. of sugar. Until six months ago she lived on a nitrogenous diet, at which time she went to New Mexico and spent the winter, abandoning her nitrogenous diet. She reports that her diarrhoea bothers her much less. She gives no account of excessive flow of urine. Urinalysis is as follows: Amber, sp. gr. 1022, acid, no albumin, no sugar. During the eight years I have known her she has been an active, energetic woman, bright intellectually, and has the general appearance of vigorous health.

I have stated above that she is the mother of three vigorous children, although the second one has the following interesting history: When he was four months of age I circumcised him for a tight prepuce. His urine irritated the wound and the excoriation traveled over the pubes, scrotum, buttocks and thighs extensively, but after some delay he made a good recovery. For months previous to this time he had been annoyed with an eczema on the head and body. Some months after recovery from circumcision and attending excoriation he was brought to me with an irritable meatus. All this history excited my suspicion. For obvious reasons the daily quantity of urine could not be obtained and I could not get enough to take specific gravity with my urinometer. The urine was acid, no albumin, sugar one-fourth of one per cent.

Later I obtained an ounce of his urine and diluted it with an ounce of distilled water, and doubling the specific gravity gave 1020, but no sugar by fermentation. Three days after getting no result from diluted urine I got the same result from undiluted urine as in the first instance, one-fourth of one per cent. Writers agree, according to Tyson, that less than one-half of one per cent. of sugar gives no result by fermentation, because the urine absorbs its volume of carbonic acid, to produce which requires one-half of one per cent. of sugar. This being true, we get no reading on saccharometer until one-half of one per cent. has been exceeded. Then a reading of one-fourth of one per cent. should be corrected to mean three-fourths of one per cent. Urine containing three-fourths of one per cent. of sugar, when diluted with an equal quantity of water, would reduce the sugar to three-eighths of one per cent., which is less than the necessary one-half of one per cent. to show result by fermentation, hence my failure to get result.

In all these fermentations the yeast was tested with distilled water, each time proving negative.

The boy continued to have about the same proportion of sugar in his urine until 2 years of age, when he went to New Mexico. A short time ago he came back to Colorado for a few days before going to California to live. I obtained a sample of his urine and regret that I was unable to get the daily quantity. Urine was almost colorless, sp. gr. 1007, feebly acid, no albumin, no sugar.

For several years I have felt that I have had a series of interesting cases of diabetes mellitus with heredity well marked. This account shows a mother and her brother with a history as complete as we often get. But after a time I had the satisfaction of confirming the history in part, when, to my surprise, I found no sugar in the mother's urine. Is there any more reason to believe her brother's urine contained sugar? Then after eight years the daughter's urine, which had all along contained sugar, although in small and not increasing amount, is found to be normal. Did the mother ever have any sugar in her urine? The little boy's urine, which had a specific gravity of about 1020 for two years, and always sugar, now is pale in color, sp. gr. 1007,

and contains no sugar. Is he going to have diabetes insipidus like his grandmother?

The nature of diabetes is not understood, and may it not be, like dropsy, merely a symptom of a number of different diseases? On such a hypothesis we would not be surprised at the usual wide variations in symptoms, effects, progress and results.

Tyson speaks of traces of sugar being found sometimes in diabetes insipidus. Were my cases of this nature? I think not, as the sugar was too persistent and too constant to be disposed of in so summary a manner.

DISCUSSION.

Dr. E. C. Hill: It seems to me that Dr. Graham is right in his conjecture that these cases were not true diabetes, but functional glycosuria, due perhaps to some nervous instability or errors in diet. In children diabetes mellitus is a very fatal disease. In answer to Dr. Sewall I would say that the reason why the subjects of marked diabetes mellitus should not be restricted for long periods to fats and nitrogenous foods, is because such a diet is not only incapable of keeping the patient in good nutrition, but it leads also to the accumulation in the blood of diacetic and oxybutyric acids, which may give rise at any time to the much dreaded diabetic coma.

Dr. Graham: I wrote out one other case but did not bring it along; the child died at the age of a year. And another case, a man, died after an illness of three years. He had the symptoms, but I did not bring either of these cases. I thought they would not be interesting, but reported the cases about which I was in doubt, and those were interesting to me.

DISLOCATION OF THE HUMERUS, COMPLICATED BY FRACTURE AT OR NEAR THE SURGICAL NECK, WITH REPORT OF CASES.

BY C. B. LYMAN, M. D., DENVER, COLO.

This injury is a comparatively rare one and it seldom falls to the lot of a surgeon to see three cases.

Up to the year 1894, there had been reported 117 cases of dislocation of the shoulder joint complicated by fracture of the humerus in its upper portion. No single observer had reported more than five cases. In January of that year, McBurney read a paper before the New York Surgical Society, which was published in the Annals of Surgery for that year, in which he reports one case. Since that time there has been only one other case reported so far as I know, and that by McBurney in 1896. This, together with the three which I have the honor to report to-day, make a total of 122 cases.

The injury is an important one, on account of the difficulties encountered in treatment and the very serious impairment of function resulting in a majority of the cases reported up to the publication of McBurney's article in 1894.

The form of dislocation usually found in these cases is the sub-coracoid variety, the head being displaced downward and inward, lying under the coracoid process. It is also sometimes rotated on its axis, in which case the fractured surfaces are carried further apart. It is not at all surprising that this should be the form of dislocation found in these cases, as we know that in the simple, uncomplicated cases, the sub-coracoid variety makes up about 75 per cent. of all cases.

As to the seat of the fracture, we find that of the 122 reported cases, the fracture was said to have existed at the surgical neck in seventy-three; at the anatomical neck in twenty-eight. In eleven of the cases it was said that the fracture "occurred at the neck." In six there was fracture both of the anatomical and surgical necks, and in three cases it was simply stated that the fracture was in the upper part of the humerus.

In two of the cases which I report, the line of fracture was through the surgical neck; in the other it was somewhat below that point. The direction of the line of fracture has varied in all these cases, but in the cases I have seen, the line was oblique and the direction of obliquity was upward and outward. The upper end of the lower fragment usually lies external to the small fragment and is drawn upward toward the glenoid cavity.

As to the history of injury and the mode of production, we find that this has not been accurately noted. McBurney and Stimpson both say that it is quite probable that in a large number of the cases the injury was produced in the usual way—namely, by sudden abduction of the arm carried to the point of hyper-abduction, as often results from falls upon the extended arm or upon the elbow; and that the fracture takes place through continued abduction, combined, perhaps, with forced rotation, the edge of the glenoid cavity, or the acromion process, acting as a fulcrum.

In the cases which I have seen, the injury has resulted from direct violence inflicted at the seat of injury, either from a fall or a blow upon the shoulder. It is quite reasonable to suppose that in some of the cases the original injury was a simple dislocation, and that the fracture was the result of violence at the hands of the surgeon while attempting to reduce the dislocation.

Diagnosis—This is sometimes far from easy; especially when the injury to the bony structure is accompanied by a large amount of contusion and swelling of the soft tissues. But if the surgeon will bear well in mind the landmarks and signs of each injury, he should not make a mistake.

We rely for diagnosis upon the following signs: First, the absence of the head of the bone in the glenoid cavity and its presence in a new location under the coracoid process, which can be made out even in a very fleshy subject and where there is a large amount of contusion and swelling. Second, there will be a sharp outline to the shoulder, caused by the prominence of the tip of the acromion process. Third, the circumference of the shoulder, measured through the axilla, will be increased. Fourth, the arm will be freely movable and can be easily approximated to the side, which would not be the case in a simple, uncomplicated dislocation, excepting where there had been a complete

laceration of the capsular ligament. Fifth, the head of the humerus would not rotate with the shaft of the bone in rotation of the arm. This sign is the most important of all, as it removes all doubt about solution of continuity in the humerus, and, as I have already said, one should always be able to make out the head and feel it under the fingers. Measurements of the upper arm will show shortening and crepitus may be felt. Lastly, should there be any doubt as to the conditions present, the X-rays should be utilized to clear things up.

Prognosis—Until within the last few years, the prognosis was decidedly bad as far as restoration of function of the extremity was concerned. In only a few of the cases seen was it possible to restore the head of the bone to its normal position in the glenoid cavity. In some of the cases, the fracture was treated and nothing done with the dislocation, with the idea in view that after union of the fracture had taken place the dislocation could be reduced. There is no successful case of this kind on record. Others endeavored to prevent union of the fragments, and to establish a false joint at the seat of fracture. The results from this method were only partially successful. Others again resorted to open incision of the joint and resection of the upper fragment; this, too, was not satisfactory.

In six of the 122 cases the head was reduced through an open incision of the joint, and in all six it was necessary to remove the upper fragment, either at the time or subsequently. There have been four cases recorded now, including my own, where the dislocation was reduced by the method which I will describe with results that were entirely satisfactory. In the light of my own experience, I should say that whereas the injury is certainly a grave one the prognosis under proper treatment is fairly good.

Treatment—The treatment of this particular injury has excited interest for many years, even as far back as the year 1835, and all the authorities have been united in the opinion that here we have a condition hard to cope with and one where the results have been far from satisfactory. All surgeons have been agreed upon one thing, namely, that when a fracture and a dislocation of the same bone exist, the dislocation should be remedied first and the fracture last. Reference to authorities prior to the year

1894 show that each and every one of them advise that every endeavor should be made by direct manipulation by extension and leverage, under an anaesthetic, to reduce the dislocation. It is also recorded by them that these methods were usually unsuccessful.

We find that in event of failure there were several methods of procedure advised: First, to treat the fracture and obtain union, leaving the head of the bone in its new position with the hope that a new socket would be formed that would be of some service. Second, to prevent the fractured surfaces from uniting by daily manipulations, thus causing a false articulation to form at the seat of fracture, which might, in a measure, act as a substitute for the normal shoulder joint. These procedures are certainly both unsurgical and are not to be thought of at the present time. Third, to secure union of the fracture and then make an attempt at reduction of the dislocation. This is also to be condemned, for we can never be certain that union will take place; and if it does, it may be delayed long beyond the usual length of time, and every week of delay means a diminished chance for reduction of the dislocation. Then again, union may take place with a large amount of deformity, owing to the fact that the small, upper fragment cannot be properly adjusted or held in place. Oger reports ten cases where this was done, and in only three of these was it possible to reduce the dislocation afterwards. Of the methods for reduction advised, the only one which to my mind seems justifiable is that of attempting to force the head of the bone into the glenoid cavity by direct pressure. Extension will avail nothing, as the force will be expended in pulling the fractured surfaces further apart, and there is certainly great danger of doing irreparable damage to nerves, blood vessels and soft tissues in the neighborhood.

In one of the cases I reported, there had been considerable damage done to the soft tissues before I saw the case, by the long continued and repeated use of extension and pressure with the foot in the axilla. In one of the cases reported, death followed these manipulations and was said to have been the direct result thereof.

The reason why these cases are so difficult to manage is that owing to the shortness of the upper fragment and its deeply

buried position one is not able to grasp it for the purpose of producing extension. After going carefully over the literature of this subject prior to 1894, one can but feel that the methods advised were crude, unsurgical and unsuccessful. The question is, have we anything to offer to-day which is better? We have presented to us for our consideration two procedures: First, a resection of the small, upper fragment; second, cutting down upon the seat of fracture, exposing the upper fragment and then, by means of a hook or forceps, pulling the head of the bone into the glenoid cavity. Of all these methods, I feel that resection should be excluded, or at least should not be thought of until everything else had failed, as it could certainly only leave the arm badly crippled. Opening the joint, liberating the resisting portion of the capsule, thus allowing of the easy reposition of the head of the bone, is certainly a procedure which is not contrary to good surgical practice and might possibly be considered in a certain number of cases.

The last procedure is the one which I especially desire to speak of,—the one first advised by McBurney: An incision is made on the outside of the arm and over the seat of the fracture, exposing the lower end of the upper fragment. A hole is then drilled on the side of the fragment and about three-fourths of an inch from the lower end. Into this hole is fitted the end of a specially constructed hook. Traction is then made in a line at a right angle to the body, the arm being held up by an assistant. It is usually a fairly easy matter to pull the head of the bone into the glenoid cavity. After this has been accomplished, the fracture is to be adjusted and, if thought best, can be held in place by one of the numerous methods in vogue, such as wiring, or the use of steel nails. The wound is then dressed and a dressing of plaster of paris applied, extending from the neck to the hand.

McBurney had some doubt as to whether the bone would stand the amount of traction necessary to pull the head into place. He conducted some experiments with fresh bones and found that they would easily stand a strain of 175 pounds, which is more than would ordinarily be used in reducing a dislocation of this character. I have used this method in two of my cases with this modification: Instead of using the hook, I used a pair

of forceps, so constructed that the end of the bone could be grasped without any danger of crushing it; the only portions of the forceps coming in contact with the bone were two sharp points on each jaw. These points would penetrate the periosteum and bury themselves in the bone without doing any damage.

Case No. 1. Mr. B. H., age 42, single, consulted me, giving me the following history: One year previous to this time, while in the woods chopping logs, a tree fell on him, threw him to the ground and, striking him upon his right shoulder, produced a dislocation of the shoulder joint and a fracture of the humerus at the surgical neck. He consulted a physician at that time, who made every reasonable endeavor to reduce the dislocation of the humerus, but was unsuccessful. He then applied splints to the fracture to maintain the fragments in position for eight to ten weeks, at which time the splints were removed and it was found that only partial union had been secured. When he was seen by me, there was fibrous union of the fracture; the head of the humerus lay underneath the coracoid process. In view of the fact that the head of the bone had been out of the glenoid cavity for one year, I determined that the proper thing to do was, first, to secure union in the fracture, and then, if it seemed advisable, to institute some operative procedure, with the idea in view of forming a new joint, or cleaning out the old glenoid cavity and making an effort to restore the head of the bone to its normal position. I therefore operated upon the fracture, cutting down upon the fragments; resected the ends; secured them to each other by means of silver wire; a plaster of paris dressing was applied from the neck to the hand. After a rather prolonged period of time, union was secured in the fracture. The patient then left the city and I did not see him again for three years, at which time he was on a visit to Denver and I had an opportunity of making an examination of his arm. I found union perfectly solid in the fracture. He had quite free motion of the bone in its new position underneath the coracoid process. This motion, supplemented by a freely movable scapula, enabled him to use that arm almost as well as the uninjured one, as is evidenced by the fact that after he left the city he was employed by a telephone company in Chicago as a line repairer, being obliged to

climb poles to repair wires. He tells me that he experienced no inconvenience whatever.

This case well illustrates one of the older methods of treatment of which I have made mention above, where it is advised to secure union of the fracture and leave the dislocation alone, and the result obtained in this case would certainly be called a good one.

Case No. 2. Thomas W., age 42, single, a miner, on May 31, 1897, fell down a stope in a mine fifty feet, striking several timbers on his way down; this served to break the force of the fall. He was taken out and when examined was found to have innumerable contusions all over the body. It was also found that he had sustained a dislocation of the right shoulder joint. Several attempts were made by the surgeon at the mine to reduce the dislocation, but without success. He was brought to Denver and I saw him seven days after the injury, at which time I found a large amount of ecchymosis and swelling about the shoulder joint, in the axilla and along the arm, some of which I attributed to the repeated manipulations. He was placed under an anaesthetic and it was found that he had a sub-coracoid dislocation of the right shoulder and a fracture of the surgical neck of the humerus. Whether this occurred at the time of the accident or was due to manipulations, I could not discover. Direct pressure was used to a moderate extent, to try and reduce the dislocation, but without success. I then cut down upon the fracture and with the forceps (which I pass around) grasped the lower end of the upper fragment and, by exerting traction in a line at a right angle to the body, succeeded with a slight pull in reducing the dislocation. The fracture was adjusted, the ends being held in position with silver wire. The wound was stitched, dressed and a plaster of paris splint applied, extending from the neck to the hand. After three weeks he was sent home and placed under the care of the local surgeon, who later reported complete recovery and good use of the arm.

Case No. 3. J. D., age 35, married, was thrown from a wagon, striking upon his shoulder and arm, amongst some bowlders. When I saw him, I found he had a badly swollen and contused shoulder. Examination showed the head of the left hu-

merus to be lying underneath the coracoid process, and from the mobility of his arm there was, apparently, a false joint below the glenoid cavity. The arm could be approximated to the side and the head could be felt to remain stationary when the arm was rotated. The arm measured a little more on this side than on the uninjured side. A diagnosis was made of dislocation complicated by a fracture. Attempts were made to reduce the dislocation, under ether, by direct pressure and gentle traction. This was unsuccessful. An incision was then made down upon the seat of fracture and traction carried out by means of forceps, as in the other case. Somewhat more difficulty was encountered, but by combining a slight amount of rotation and extension reduction was accomplished. The fractured surfaces were held in position by the use of silver wire, as in the previous case. The wound was stitched, dressed and a plaster of paris splint applied from the neck to the hand. The case pursued a perfectly normal course, and recovery with a perfectly useful arm resulted.

In both of these cases, I was surprised at the small amount of force which was required to pull the head of the bone into the glenoid cavity. Both of these cases recovered with perfectly useful arms. The results were as good as is usually seen in a simple, uncomplicated dislocation of the shoulder.

From the experience I have had in these cases, I would say that when a surgeon sees a case of this kind he is justified in using a moderate amount of direct pressure, under an anaesthetic, to reduce the dislocation; that extension with the foot in the axilla is to be condemned, and that if a very moderate amount of manipulation does not accomplish anything, he should then proceed to cut down on the fracture and reduce the dislocation, according to the method of McBurney.

DISCUSSION.

Dr. G. W. Miel: I would like to say that the paper just read reflects great credit on Dr. Lyman and the society. It is one of very practical import, and I should be very glad for one to have such a paper printed for future reference.

SYMPOSIUM ON SYPHILIS.

MODES OF INFECTION.

BY E. P. HERSHEY, M. D., DENVER, COLO.

Were I, Mr. President, ladies and gentlemen, to make a single statement as regards the subject assigned me in this symposium, i. e., "The Modes of Infection," I would state that there is but one mode—that by absorption through contact. In briefly stating some of the modes of infection, we would do well to be cautious as to our statistics, especially those gleaned from our patients. Were we to believe all they tell us we would soon be convinced that the very air we breathe is impregnated with the virus, and that one of the most common modes of infection is through this channel.

It is astonishing that this loathsome disease does not spread more among the innocent than it does, through the carelessness displayed by those who are afflicted. It seems as though there must be a guardian angel constantly hovering over the innocent and unwary. The careless barber with his unsterilized razor; the dentist who works from mouth to mouth; and, we must admit, the careless, slovenly physician, whose errors should be considered only as a crime, are channels through which this virus has entered the tissues of the innocent.

Those soft-brained women with a desire to kiss every tot they meet are often responsible for graver results than the night terrors they give the little ones. Nurses, more innocent of the results than the cause of the mucous patches in their mouths, have often been responsible for inoculating children with the disease. Down in Louisiana a case of this kind occurred in which a child having cut his forehead, the nurse kissed it, a

chancre appeared some two weeks later, and the mother, too, was inoculated by nursing the child, the chancre coming in contact with the upper part of the breast. Servants using the syringes of their employers have been responsible for the inoculation of the innocent. Holding money between the lips has been reported as a cause of the inoculation of this disease. Wearing a tight-fitting hat belonging to another, the sweatband of which presses a deep furrow into the skin of the forehead; using a cigar cutter; licking the same envelope that another has licked in order to better seal it; using a neighbor's lead pencil and holding the point between the lips, are a few authenticated ways of inoculating this disease. The lavoratory is responsible for its spread. Using the same soap, same towel, drinking from the same cup that others drink, and sitting upon the same closet seat that every other tenant in the block uses. A striking mode of contagion is that reported by Dr. Gallaher, in which, a young man having gotten a cinder in his eye, the lid was turned down and the cinder licked out with the tongue by a woman who does not stand the highest in the estimation of people. This patient was inoculated with the disease, the chancre appearing upon the lower lid some ten days afterwards.

These few unique illustrations of the modes through which this disease can enter the system are given more for the purpose of a warning as to the possibilities of the inoculation of the innocent than to attempt a history of all the modes that have been recorded.

A disease so closely guarded by the sufferer and one that permits him to mingle so closely with his fellow men has its dangers in its difficulty of detection. The constant interchange of personal apparel, and articles that are placed in the mouth, and a disease so rampant in all classes of society, are sufficient to make it a duty upon the part of every physician to warn his patients not to trust too implicitly in the purity of his neighbor.

PROBLEMS OF DIAGNOSIS OF INITIAL SYPHILITIC LESIONS.

BY WILL B. DAVIS, M. D., PUEBLO, COLO.

The problem of diagnosis in suspected initial lesions of syphilis consists mainly in differentiation, in order of frequency, from the simple venereal ulcer, herpes progenitalis, gumma, epithelioma, and papules or beginning ulcerations of lupus vulgaris.

As a rule, the gross appearances peculiar to each are either sufficiently absent as to all but one, or conspicuously present as to the one or the other to permit of a diagnosis either directly or by exclusion.

In *chancre* we usually find a single lesion, when multiple appearing simultaneously, seldom successively; with induration almost constantly present, first appearing as a papule or an eroded spot; not necessarily ulcerating, though usually a superficial ulceration is present; round or oval, with regular outlines; scantily secreting; but slightly sensitive; with an incubation history of from a fortnight to a month; often not venereal; not uncommonly extra-genital; non-autoinoculable, and accompanied by polyadenitis which is rarely suppurative.

In *chancroid:* Rarely solitary lesions; multiple ulcers often developing successively; non-indurated, but sometimes accompanied by inflammatory thickening; always in the form of an ulcer, with undermined edges; at first round, but later angular in outline with irregular borders; giving a copious purulent and often saneous secretion; very sensitive; with an incubation history of from twenty-four hours to three or four days; almost always of venereal origin; almost always situated on the genitals or immediate vicinity; always autoinoculable, and accompanied by monadenitis which is frequently suppurative and virulent.

In *herpes progenitalis:* No incubation history. Starts as vesicles, generally in clusters, which frequently become ruptured and irritated, and instead of vesicles we find an erosion or superficial ulceration, when the usually serous secretion is changed to

a sero-purulent discharge. Herpes progenitalis originates from uncleanliness or irritating secretions. Adenitis is generally absent.

In *gumma* upon the genitals: The history of antecedent syphilis, absence of adenitis, and, as a final resort, its behavior under full doses of the iodides.

In *epithelioma:* The history as to duration, its sharp outlines, distinctly raised or so-called "rolled-up" borders, and pearl-like nodules here and there about its margins.

In *lupus vulgaris:* Its chronicity; its superficiality; its small, multiple points of ulceration, tending to cicatrize here and there, and apple-jelly-colored papules encroaching upon the healthy skin beyond.

The microscope reveals, in chancre, blood vessel changes, hyperplasia of the fixed connective tissue elements, and condensation. In chancroid, absence of vessel changes, absence of hyperplasia of the fixed connective tissue elements, with solution of tissue. In gumma, the same appearance of blood vessel changes and hyperplasia of fixed connective tissue elements as in chancre, plus gummatous degeneration. In epithelioma, the characteristic epithelial invasion; and in lupus vulgaris, caseation and the tubercle bacillus.

As between chancre and chancroid, differentiation is not always satisfactory even after careful consideration of established points of contrast, and I fear a degree of uncertainty will continue to linger until the bacillus,—or whatever it is,—of syphilis is discovered. It is, therefore, not best to give an absolutely positive diagnosis based entirely upon the initial lesion however nearly, in part or in whole, it may approach our idea of the true chancre; nor be too sanguine that we are only dealing with a venereal ulcer. For, in the first place, contributory conditions may cause the chancroid to simulate the chancre; and, upon the other hand, we should never forget the possibility of a mixed infection, or the inoculation of syphilis upon a chancroidal base.

THE BACTERIOLOGY OF SYPHILIS.

BY W. C. MITCHELL, M. D., DENVER, COLO.

Four hundred years ago Fernelius gave a description of syphilitic infection which has scarcely been improved upon up to the present time. Notwithstanding many arduous attempts, we are but little nearer to a solution of the true etiological agent of syphilis than when his sentences were penned in the grey dawn of science.

According to Fernelius[1] (1485-1558) the syphilitic virus first infects one portion of the body and then spreads throughout the entire organism; (2) all the tissues and fluids are finally drenched with the syphilitic poison; (3) the tissues and the fluids are the vehicle of the contagion; (4) the infection occurs only by direct contact on a portion of the mucous membrane or skin denuded of its epithelium; (5) syphilis dating from birth has had its origin in the parents; (6) syphilis may remain latent in the system, and, finally, (7) a person suffering with syphilis can not receive a fresh infection.

That there is a syphilitic virus we now know as well as did Fernelius when nearly four centuries ago he wrote his wonderfully accurate laws. As to the nature of this virus a scrutiny of the work done in this direction will enable us to see whether recent investigation has definitely settled this matter.

In what may well be termed the pre-bacterial days, i. e., when investigators had conceptions which were more or less vague as to the nature of those microscopic entities which were being associated with various diseases as their causative factors, several workers had put forth etiologic claims for micro-organisms discovered by them. In 1837 Donné found an organism in the pus of buboes and in the tissues of chancres which he named *vibrio lineola.* In 1869 Hallier reported that he had discovered the etiological agent of syphilis in a micrococcus which was present in the blood of those suffering from syphilis. In 1872 Los-

[1]M. Kaposi, Aetiologie der Syphilis.

tofer believed he had found the causative factor of this disease in what he termed syphiliskörperchen or syphilitic granules. These granules appeared in the blood of syphilitic victims, and were demonstrated by keeping their blood in a moist chamber for several days.

These and other unimportant discoveries which appeared from time to time have all since been proven to have had their errors in a faulty technique which was unavoidable when one considers the early days of bacteriology. It was only commencing with the years of 1879 and 1880, when, under the masterful minds of Pasteur and Koch, bacteriology crystallized into a science with well-defined laws and technique, that workers were equipped with weapons which at least gave promise of an ultimate victory.

In 1879 Klebs reported that he had discovered what he presumed to be the etiological agent of syphilis in syphilitic tissue and fluids. An ape was inoculated with this micro-organism with what was thought to be positive results. In morphology this organism was peculiar, and Klebs thought he had discovered a new species. This bacterium he christened with the name of "helicomonaden." Strict investigation of Klebs' helicomonaden showed that they could have no legitimate claim as the etiological agent of syphilis.

An organism put forth a few years later by Birch-Hirschfeld met with the same fate and has since been relegated to the past, having historical interest only.

In 1884 Lustgarten, working in Weigert's laboratory, put forth the claim that he had discovered "a specific bacillus for syphilis which was distinguished by its morphology, arrangement and tinctorial properties." According to Lustgarten, these bacilli were found in practically all syphilitic tissues and neoplasms. In morphology and staining properties this bacillus of syphilis strongly resembles the bacillus of tuberculosis and the bacillus of leprosy, with both of which diseases syphilis has some characteristics in common. Doutrelepont and Schütze discovered the same bacillus independently of Lustgarten, and numerous other investigators promptly confirmed Lustgarten's work. Hence, it was readily believed that the "veritable germ" had at length been discovered. All attempts to cultivate this bacillus

artificially signally failed, and thus the second, third and fourth laws of Koch could not be carried out.

Considerable doubt was thrown on the value of Lustgarten's bacillus by the discovery of Alvarez and Travel in the following year of the micro-organism which we now know as the smegma bacillus. Matterstock also discovered the same bacillus independently and in the same year. According to these observers, a bacillus was constantly found in the smegma of the male and female genital organs which resembled in all details the bacillus of Lustgarten, both as to morphology and staining properties. This bacillus is also frequently found in the moist parts adjacent to the genital organs. Baumgarten and many others are of the opinion that the bacilli which Lustgarten found in syphilitic lesions taken from or near the genital organs were the smegma bacilli, and that the bacteria found in places at remote parts from these organs were tubercle bacilli, and that in these cases there was a mixed infection of tuberculosis and syphilis. On the other hand, the eminent Viennese syphilographer, Kaposi, thinks it probable that the bacillus of Lustgarten is the veritable bacillus of syphilis, and, as much of the material obtained for Lustgarten's work was taken from Kaposi's clinic, he has followed Lustgarten's work very closely.

In 1892 P. Doehle[2] reported that he had discovered a protozoa in the secretion from chancres and also in the blood of syphilitic patients. In later communications (1897) he reports finding them in sections of syphilitic tissue and also reports successful animal inoculations.

The next most important work done with reference to the etiological agent of syphilis was by van Neissen of Wiesbaden in 1898[3]. Van Neissen claims that if a proper examination of the blood of one afflicted with syphilis be made, one will without a single exception find certain minute rose-colored or reddish forms with green edges—plasma granules or molecules. Whether these forms are identical with Lostofer's granules which have been mentioned above van Neissen is not able to say, but he contends that these granules in the blood are pathognomonic, and can not understand why so many ardent stu-

[2]Centralblatt für Bacteriologie, 1892.
[3]Centralblatt für Bacteriologie, 1898.

dents of the blood could have overlooked them unless they mistook them for contaminations. In the routine examination of his syphilitic patients he never fails to find them. These granules are in some way dependent upon or related to his specific micro-organism. To this micro-organism the name diplo-bacillus has been applied, and van Neissen has succeeded in cultivating it from the blood of several syphilitic cases, the characteristic growth being long-drawn-out thready projections which call to mind the development of the anthrax bacillus. Rabbits, according to this author, are susceptible to syphilis, as he has succeeded in calling forth in these animals both abortion and characteristic lesions by his inoculations.

In passing, it may be remarked that a study of the blood for van Neissen's granules, and also by the application of the Justus blood-test for syphilis in which the hemaglobin is rapidly reduced by a single inunction of mercury, promises to clear up many obscure and doubtful cases of this disease.

From this short resume of the most important research done with reference to the etiological agent of syphilis, it will be seen that the question is as far from solution as ever. One of the principal difficulties in the way seems to be the fact that animals are little if at all susceptible to the syphilitic virus, thus limiting in a very decided manner the experimentation on this subject.

In conclusion, it may be said that while a bacterial etiology is usually supposed to be true in syphilis, it is well to bear in mind that the true etiologic factor may be found, after all, not to belong to the vegetable kingdom as represented by bacteria, but it may be found in the lower forms of the animal kingdom. Van Neissen admits the possibility of Doehle's protozoa playing an important side-role in this disease. In this connection it may be mentioned that biologists[4] have a third division of these lowest forms of life which seems to be the connecting bond between the bacteria and the plasmodia-mycetozoen, or, as some German writers have it, pilzilume fungus-animal. It is by no means disproven that van Neissen's interesting micro-organism does not belong to this class.

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[4]Techniche Mycologie La Far, 1897. Lehrbuch der Zoologie, Heitwig, 1897.

A novel and extremely important method of bacterial culture had its origin a few years ago in the Pasteur Institute when Nocard, acting on some prior work of Metchnikoff's, introduced the method of culture which is now known as the collodion-capsule method. Capsules are made of collodion about the size of a small test tube, sterilized, filled with suitable culture media, inoculated with the material to be investigated and then placed in the peritoneal cavity of a rabbit. The rabbit is thus made to play the part of a living incubator, and bacteria are thus placed where endosmosis and exosmosis can take place in the bodily juices of the animal, and the bacteria are protected from the leucocytes. Several important discoveries have been made by this method of culture, and it may be, should further investigations prove Lustgarten's or van Neissen's claims to have been erroneous, that this novel method of culture may shed light on the obscure subject of the etiology of syphilis.

CUTANEOUS MANIFESTATIONS OF SYPHILIS.

BY J. M. BLAINE, M. D., DENVER, COLO.

From a diagnostic standpoint, the eruptive stage of syphilis is of much greater importance than either the primary or tertiary. True, the tertiary stage is more serious to the patient, but in almost all cases the diagnosis is made or confirmed by the cutaneous manifestations, and if proper treatment is instituted and carried out the case will rarely pass beyond this stage.

There is no pathologic lesion occurring in the skin which may not be imitated by the eruptive stage of syphilis, hence it is that syphilis is sometimes mistaken for other dermatoses, and innocent eruptions are so frequently diagnosed syphilis.

The rule "When in doubt play trumps" may be good in whist, but the physician who carelessly or ignorantly diagnoses every skin eruption syphilis, as I have, alas, too often seen, casts

a blight and suspicion on the fair name of many an innocent patient and ruins many happy homes. The physician who is too lazy to study dermatology sufficiently to be able to differentiate an ordinary simple skin eruption from syphilis, or who wilfully makes the mistake for purposes of financial gain, should be driven in disgrace from the ranks of an honorable profession.

In carrying out the wishes of the executive committee, I shall endeavor, in the few minutes allotted to me in this symposium, to call your attention to some of the differential points between the various forms of syphilitic eruption and the dermatoses which they simulate.

In studying the eruptive stage of syphilis, it must be remembered that its evolution is slow and classic. The length of time intervening between the initial lesion and the manifestations on the skin has much to do in determining the character of the eruption; thus the early secondaries are different from the late secondaries; and where the eruptive stage has been delayed by an insufficient course of treatment following the initial lesion, the eruption will be different and usually more severe.

Certain forms of eruption have a predilection for certain regions of the body. This is not only true of syphilis, but is also true of the various dermatoses for which syphilis might be mistaken.

I cannot attach much importance to the color of a syphilitic eruption, which we are taught must be "coppery" or the color of "raw ham." The color depends largely upon the complexion of the patient. An Albino would show a pink lesion while a negro would present a black one, and the various shades of color between these extremes would represent almost all the colors of the rainbow. My own experience has been that had I depended upon the color of the lesion to predicate a diagnosis, I would have seen but few cases of syphilis. The color at first is due to dilatation of the capillary vessels, hence in the Caucasian is red or pink and may be made to disappear by pressure. As the inflammatory process continues, cell infiltration takes place and later there is a deposit of pigment. This combination gives the typical "raw ham" or coppery color. As the inflammatory process subsides, the vessels assume their normal calibre and noth-

ing is left save the pigment which is bronze in color, hence the color depends also upon the age and condition of the lesion.

Polymorphism is a distinctive feature of syphilis. As the disease progresses in its classic evolution, one form of syphilis may follow another so closely as to overlap, so that in a typical case two, three, or even four varieties may be seen on the same subject. Polymorphism is pathognomonic of syphilis and is not found in any of the other 137 dermatoses.

The form and distribution of skin eruptions in syphilis are also characteristic. The earlier eruptions, as a rule, cover most of the body, while their shape is round. Later eruptions, while they may still retain their symmetrical distribution, show a tendency to group in patches, while still later eruptions usually have the rounded lesion, but pay no heed to symmetry.

The crusts of syphilitic lesions are usually of a greenish tinge and, unless undermined by pus, are tightly adherent.

The ulcers of syphilis resemble a chancroidal ulcer, and in shape are round, oval, or reniform.

A syphilitic cicatrix is round, smooth, and, at first, colored by pigment. The pigment disappears at first from the center and later the entire cicatrix is white, surrounded by pigment.

For a disease which shows the amount of pathologic changes, syphilis is remarkable for the almost entire absence of subjective symptoms. The sensations of burning, stinging, itching, and pain, so common in most dermatoses, are in almost all cases of syphilis entirely absent.

According to the best authorities, the cutaneous manifestations, occurring during the secondary stage of syphilis, are divided into seven different varieties: 1. Erythematous. II. Papular. III. Pustular. IV. Pigmentary. V. Vesicular. VI. Papulo-squamous. VII. Tubercular. Those found during the tertiary period are: I. Rupial. II. Ecthymatous. III. Gummatous.

The earliest skin eruption is the *erythematous* or macular, which usually makes its appearance from four to eight weeks after the appearance of the chancre and manifests itself first on the chest and abdomen and later on the extremities. The macules are rounded in shape and are due to capillary dilatation, and for this reason appear first on the parts of the body where the integument is thinnest. The exposed parts of the body,

where the skin is thicker, may not be attacked at all by this variety, especially if proper treatment is instituted as soon as the diagnosis can be safely made.

Before cell infiltration or pigmentary deposit has taken place the color may be made to disappear by pressure. This variety of syphilitic eruption must be differentiated from measles and from the eruptions caused by the internal administration of certain drugs. In measles we have the catarrhal symptoms and rise of temperature, and may also be aided by the history of contagion. In dermatitis medicamentosa there are no objective symptoms other than the rash, while the subjective symptom of itching is rarely absent and is usually very pronounced; besides, the history of having ingested certain drugs may also be obtained.

In erythematous syphilide, the subjective symptoms are wanting, but the enlargement of the post-cervical, epitrochlear and other glands will usually make the diagnosis easy. This eruption, being the earliest in the course of the disease and showing less pathologic changes, will naturally show less persistence and yield easiest to treatment. If left to itself it may disappear in a few days or weeks to relapse again or be followed by other varieties, while under specific treatment it will fade very quickly.

The *papular* syphilide makes its appearance usually about two months after the chancre. It may be associated with the macular, or may come after the latter has disappeared. There are two varieties of the papular syphilide, the small miliary and the flat, the latter being the more common. The papules are round, flat on the apex, and as they develop they increase in circumference at the base. The top of these papules is frequently umbilicated and the epidermis shows a decided tendency to scale. They are scattered over more or less of the body, frequently invading the face, and do not show any tendency to grouping. In color, they at first show the pink of congested capillaries, and later the admixture of pigment shows the characteristic "raw ham" color. On the palms the papules do not rise above the surface, but appear more as macules which show a tendency to scale off and leave depressions. As a rule, these macules on the palm are discrete and do not show the tendency to coalesce; that is found in the later squamous syphilides.

Where a dry papule occurs on the skin between two opposing surfaces it may become moist and increase in size, forming what is known as the mucous patch on the skin.

Papular syphilide may be mistaken for lichen planus, but this disease shows a tendency to grouping and is rarely found on the palms and soles. On the wrists and ankles it is found in small pointed papules and on the body in large, flat, umbilicated lesions. The lesions on the body are generally quadrilateral and often arranged so as to imitate mosaic art work. Lichen planus always itches and does not show any glandular involvement, mucous patches, or hair falling.

The *pustular* syphilide appears in from six weeks to several months after the initial lesion, and is found on all parts of the body. A syphilitic pustule is slow in developing and may rupture and discharge its contents or disappear by absorption. In either case, a scab is left varying in size according to the size of the pustule, and when this comes off a round white scar is left to mark the site. Around this white scar a ring of pigment remains for some time which greatly assists in the diagnosis. Following the classic evolution of syphilis the severity of the pustular syphilide will depend much upon the time elapsing since the appearance of the chancre; thus the more superficial pustule comes as an early secondary, while the deeper seated, which usually develops on an inflamed base, appear as a late secondary. These larger pustules should not be confounded with the ecthymatous ulcerating gummata which appear during the tertiary period.

There is no condition likely to be mistaken for pustular syphilide unless the pustules should happen to be limited to the face, chest, and back, in which case one might think of an acne vulgaris. As a rule, acne comes on at or about the age of puberty and is always associated with comedones and excessive sebaceous secretion, while pustular syphilide usually comes at a later period in life and is associated with glandular enlargements, mucous patches, and other signs of syphilis; and, if a syphilitic patient could be believed, much might be learned from the history of infection. Pustular syphilide has been mistaken for smallpox where the pustules have shown a tendency to umbilica-

tion, but the evolution of a smallpox lesion is so exact and regular that no one should confound the two diseases.

The *pigmentary* syphilide is a rare occurrence and its existence is even doubted by many syphilographers. It usually makes its appearance during the latter half of the first year and is found on the neck and chest. It is thought by some to be a pigmentary deposit resulting from the erythematous syphilide, and by others to be a distinct syphilitic eruption. Until the source of the pigment coloring matter has been definitely determined, we must remain more or less in the dark regarding the pigmentary syphilide. The curious feature of this manifestation is that it is uninfluenced by syphilitic treatment, and after lingering for months will disappear of its own accord.

The only conditions likely to be mistaken for pigmentary syphilide are chloasma and tinea versicolor. In the former condition the spots of discoloration would not show the regular distribution with intervening normal colored skin, and in the latter the spots have a branny surface which becomes pasty on the application of moisture; besides the microscope reveals the spores of the microsporon furfur.

The *vesicular* syphilide is exceedingly rare. Sometimes large vesicles appear within six months after the chancre. They are umbilicated, situated on a reddened base, and usually dry down and form a crust. More commonly, however, the vesicular syphilide is small and appears during the second year. These may be scattered over the body and limbs and are sometimes grouped in clusters or circles. Vesicular syphilide can be diagnosticated from chicken pox by the absence of itching and the presence of other syphilitic symptoms. In vesicular eczema the vesicles coalesce and form a large oozing surface, while itching is present and syphilitic symptoms absent. The bronze color around the vesicular syphilide will also aid in diagnosing it from all other vesicular eruptions.

The *papulo-squamous* syphilide may appear near the end of the first year or at any later period. It consists of a papular infiltration covered by fine, tightly adherent scales, and may occur on the face or any other part of the body. The spots may appear singly or be grouped in patches or circles. So long as the infiltration lasts the scales will continue to form and peel off.

Where the eruption occurs in a circle it begins as a circle and not from a central point. Sometimes it represents only a segment of a circle, and these may unite and form an irregular gyrate lesion. The most frequent site is on the face and forehead (along the margins of the hair) and around the genitals. It may also occur on the palms and soles, as individual papulo-squamous lesions.

Papulo-squamous syphilide may closely resemble lupus erythematosus and psoriasis. Lupus erythematosus is a new cell formation usually occurring about the nose and cheeks. It is a disease of slow progress and long duration. Papulo-squamous syphilide occurs on the face, along the margins of the hair, and on other parts of the body, and would show the concomitant signs of syphilis. Psoriasis begins as small papular lesions situated on a reddened base and on removal show a bleeding point. They show a decided preference for the extensor surfaces and soon develop into large, dry, scaly patches. On the palms and soles papulo-squamous syphilide may resemble an eczema, but eczema shows irregular patches, shades off into the healthy skin and always itches.

The *tubercular* syphilide may occur as a generalized form or in groups, the latter being the more common. The generalized usually occurs near the end of the first year, while that in groups occurs during the second year. The tubercular lesion develops deeply in the true skin and occurs as patches or groups in circles or parts of circles. A single patch may be a solid elevation of the skin composed of several tubercles clustered closely together, rough on top and covered with scales. An individual tubercle is livid in color, afterwards coppery; the top is surmounted by a scale or pustule, and when it disappears usually leaves a white cicatrix. The ulcerating tubercular syphilide marks the border line between the secondary and tertiary periods. It may occur on any part of the body, but its favorite site is on the face. The patch spreads by additions to the periphery, the central lesions becoming absorbed and leaving slight scars. Afterwards new lesions develop on the site of the old ones and, this process being repeated a number of times, the patch loses its integrity and ulceration takes place. There is no

other condition for which tubercular syphilide could be mistaken if one carefully observes the central cicatrix.

The *pustulo-bullous* or *rupial* syphilide belong to the tertiary period and occurs normally about the end of the second year, but an insufficient course of treatment following the initial lesion may postpone its appearance for years. I recall one case where a rupia appeared fourteen years after a six-months' course of mercury, and another which appeared seven years after three months of treatment. A rupia may begin either as a pustule or a bulla. In either case, a crust is soon formed under which ulceration takes place. At first the scab is small, but as the ulcerative process continues to spread deeper and wider the crust is added to from beneath so that it becomes pyramidal or oyster shell in shape. When the crust is removed, another is soon formed. Owing to the admixture of pus and blood, the crust is blackish green in color. The ulcers have abrupt edges and may extend to the subcutaneous tissue. In shape, they may be round or reniform. When a rupial ulcer occurs on the hairy portion of the body, unless arrested by appropriate treatment, permanent loss of hair will occur. When a rupial ulcer heals, it leaves a livid scar which eventually becomes white.

The *pustular syphilide*, occurring during the tertiary period, may appear either as a single ecthymatous pustule or as a group of pustules under which ulceration takes place. The ecthymatous pustule, which is the more common, begins as a pustule with a gummatous infiltrated base. This infiltration soon gives way to ulceration and a crust is formed which at first resembles the rupial crust, but soon becomes depressed, tightly adherent, and may remain in situ till cicatrization has taken place. The scar left after an ecthymatous ulcer is soft and white and surrounded for a considerable time by a pigmented areola.

The ecthymatous ulcer may be found on any part of the body, but its favorite site is on the lower extremities. Where several ecthymatous ulcers coalesce, they may form a serpiginous lesion covering a considerable surface, healing on one side and advancing on the other.

The pustular syphilide, which occurs in groups, is a late tertiary. These pustules occur on a red base and quickly run together, forming a crust with an ulcerating surface underneath.

The crust remains flat and does not become rupial. The scar left from a pustular syphilide is white and usually has a bronzed areola.

A *gumma* of the skin may occur as a general infiltration of the skin or as a localized tumor. Either form may ulcerate. Where there is a diffuse gumma of the skin, little ulcerative points appear on the surface which run together, forming a large ulcer. The circumscribed gumma usually remains quiescent for several months, then softens in the center and the ulcerative process gradually approaches the surface, when the broken down tissue is discharged and the cavity remains as an open ulcer.

The tertiary syphilitic ulcer therefore results from a rupia, an ecthyma, or a gumma. The ulcer may extend deeply or run on the surface as in the serpiginous form. The ulcer has abrupt edges, with a soft floor.

Unless involving the bone or periosteum, a syphilitic ulcer is painless and the absence of subjective symptoms, together with the characteristic appearances of the ulcer, should make the diagnosis of syphilis a matter of ease.

SYPHILIS OF THE BRAIN.

BY J. T. ESKRIDGE, M. D., DENVER, COLO.

Mr. President and Members of the Colorado State Medical Society: The subject, or that part of the subject, which has been assigned me for discussion in the symposium "Syphilis" is "Syphilis of the Brain." I take it that this title is meant to include all the various and varying manifestations of syphilis within the cranium. The society is largely composed of general practitioners of medicine, men and women, for the most part, who are seeking facts free from theory and chaff and presented in such a practical manner that they are ready for use. Bearing these conditions in mind, I shall not attempt an elaborate critical and theoretical discussion of the intracranial manifestations

of syphilis. Indeed the time at my disposal would not permit this. I shall endeavor, after making some preliminary statements, to present a few facts on the ravages of syphilis within the cranium, and then to follow these by some practical suggestions in relation to symptomatology, diagnosis, prognosis and treatment, laying especial stress upon the uselessness, yea, harmfulness, of vigorous and prolonged antisyphilitic treatment for the relief or removal of most of the indirect effects of syphilis of the central nervous system.

Syphilis of the brain, as is well known, may be inherited or acquired. The personal experience of a single observer is insufficient to enable him to determine in which sex inherited syphilis or its effects predominate, and I know of no statistics to enable me to arrive at any definite conclusions in respect to this. Acquired syphilis of the brain is found nearly three times more frequently in the male than in the female. The symptoms of inherited syphilis usually manifest themselves before or soon after birth, or during the first few years of extrauterine life; although in exceptional cases they have not been observed until the twentieth or thirtieth year has been reached. We can not be too cautious in accepting the statements of observers that the first manifestations of inherited syphilis did not appear until the twentieth or thirtieth year, because between the ages of 18 and 35 or 40 the initial lesion of syphilis is most commonly contracted.

In what proportion of those who have been infected by the syphilitic virus do symptoms of syphilis of the brain develop? Dr. J. V. Hjelmmann thinks about one and a half to two and a half per cent.[1] It must be remembered that this proportion is given after excluding all cases of paretic dementia and tabes. Of those who have tertiary syphilis, about twelve per cent. according to Hjelmmann, and twenty-one per cent. according to Fournier, show brain symptoms of syphilitic origin.[2]

Important questions, and ones that we are often asked are: How long after the initial lesion is it before syphilis of the brain may develop, and does the time ever arrive when we are

[1]W. Julius Mickle, on Syphilis of the Nervous System, Brain, Part I, 1895, p. 99.

[2]Ibid.

justified in saying that the length of time since the chancre was contracted is so great there is no longer any danger of the brain becoming involved? In answer to the first question, How long after the initial lesion of syphilis is it before brain symptoms may develop, we can only say that the length of time is variable and indefinite; that certain lesions, among which may be mentioned inflammation of the arteries and the degenerations, are classed among the tertiary lesions, or chronic effects of syphilis, and occur commonly from the fifth to the twelfth year after luetic infection; that the gummatous inflammations of the membranes often appear much earlier; that syphilis of the brain may not develop until the elapse of many years (probably thirty or forty); finally we have to admit that there are many cases of so-called precocious syphilis of the brain on record, in which symptoms of syphilis of the brain have developed within one or a few months from the manifestations of constitutional syphilis. I saw in consultation with Dr. Clayton Parkhill of this city a case of syphilitic degeneration of the cerebral arteries in the person of a young man who had contracted a chancre three months before. This man had been treated for the initial lesion by Dr. Parkhill, and at the time he was stricken down with an apoplectic stroke, due to thrombus, if I mistake not, he was taking mercury. Dr. Sydney Roberts, of Philadelphia, reported a few years ago a case of syphilis of the brain, the symptoms of which developed two months and eight days after the chancre appeared, the latter having a period of incubation of twenty-six days. Dr. H. C. Wood, in his brochure entitled "Syphilis of the Nervous System," pages 6 and 7, refers to eighty cases of precocious syphilis of the brain, all occurring within a year after the appearance of the chancre; three cases developed one month after the chancre, four two months, six three months, eight four months, and fourteen five months after the chancre.

In answer to the second question, Does the time ever arrive when we can say that the length of time since the chancre was contracted is so great that there is no longer any danger of the brain becoming affected, we must say *no*, emphatically.

One other point of practical importance before passing on to the intracranial lesions resulting directly and indirectly from syphilis of the brain: Are there any known causes that have a

tendency to give rise to the development of syphilitic lesions of the brain in infected subjects? There seems to be no difference of opinion among clinicians and syphilographers that latent brain lesions, syphilitic in character, may be, and frequently are, fanned into activity by causes that greatly disturb the normal condition of the brain. On the other hand, Professor H. C. Wood is inclined to make light of many of the alleged causes that temporarily disturb the brain, such as blows, exposure to the sun's rays, and intense intellectual application. As I have stated on previous occasions, there is no doubt in my mind from my own clinical experience that chronic alcoholism renders the brain vulnerable to the poison of syphilis.[3] Tamouski believes that alcohol and heredity are the main factors predisposing to the localization of syphilis of the brain. Mickle is very positive in his statements. He says mental strain or excitement, cranial injury, sexual or alcoholic excess are the most frequent excitants to a cerebral localization of syphilis; in this playing a part even more important than their frequent one of bringing on the sudden outbreak of an already existing, but slumbering brain affection.[4] It seems to me that anything that greatly disturbs or impairs the normal condition of the brain in an infected person predisposes this organ to the development of a syphilitic lesion. What I do doubt, however, and this seems to me what Prof. H. C. Wood contends for, is that in an infected person who is entirely free from intracranial syphilis, head injuries which do not result in inflammation themselves are incapable of giving rise to an acute attack of syphilis of the brain immediately following the injury.

Pathological conditions of the intracranial structures in syphilis of the brain: So far as we know, the direct effects, or so-called characteristics of syphilitic lesions of the brain are few. On the other hand, the indirect effects, or the non-specific lesions, are numerous. It is of the utmost practical importance, both in prognosis and treatment, to make this distinction. Only the specific lesions, those that occur as a direct result of the poison of syphilis, are especially remediable to antisyphilitic treatment,

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[3]Clinical lecture, entitled, Syphilis and Alcoholism of the Brain, Etc., Medical News, April 6, 1895.

[4]Mickle, On Syphilis of the Nervous System, Brain, Part I, 1895, p. 99.

while the numerous injuries caused by the presence of specific lesions, or the degenerations resulting from toxaemic or other blood states which may result from syphilis, are in no way specific in character, and respond as tardily to antisyphilitic treatment as do the lesions resulting from causes wholly unassociated with syphilis.

Gumma. The typical specific lesion of the brain is the gumma. The formation of the gumma is the direct result of inflammation which undoubtedly has been lighted up by the poison of syphilis. It differs from the ordinary products of inflammation in being less highly organized and in having a greater tendency to degeneration. When the inflammation is acute and violent from the poison of syphilis, the inflammatory product at first varies but little from that of an ordinary or non-specific inflammation. It takes time for the gumma to assume its characteristic form. As Gowers puts it, the formation of the gumma is always attended by two elements: the process of inflammation and the process of tissue formation. One of the characteristics of intracranial syphilitic inflammation is the great tendency to hyperplasia. The gumma varies in size from a line in diameter to several inches. It may be yellowish, reddish or whitish in appearance, yet it usually has, when of recent formation, the feel and consistence of glue. No matter how large the gumma may become or the length of time it may have existed it never becomes highly organized. Its tendency is always to degenerate. This may take place in one of two ways, either by caseation or by fibrous degeneration with the formation of masses of cicatricial tissue. The gummatous deposits may be single, but they are often multiple. They are most commonly found at the base of the brain, especially early, and the region of the interpeduncular space is a favorite site. The sixth and the branches of the third cranial nerves are often affected. Gummata are often found on the cortex of the brain, especially in the motor region, sometimes in the pons, rarely in the substance of the cerebrum, and least frequently in the cerebellum. Gummatous inflammation of the membranes, both pia and dura, is frequent; in fact, this is the ordinary form of intracranial specific inflammation. In inflammation of the membranes the tendency to hyperplasia is very great. Gowers states that inflammation of the dura is

usually diffuse and the tissue formed undergoes the fibroid change, and he thinks it is most common in inherited syphilis. In the pia, the inflammation is more commonly local and the inflammatory products may undergo caseous or fibroid change.[5] Finally, the walls of the arteries are frequently the seat of gummatous deposits. The sheaths of the cranial nerves undoubtedly may be the seat of syphilitic inflammation and the nerves themselves become damaged, either by extension of the inflammation or by pressure from gummata. Whether the nerve fibers or the brain substance is ever primarily the seat of syphilitic inflammation is still in doubt. But to this I will return later.

So far, I have simply called your attention to the various places within the cranium in which gummatous deposits may be found. I wish now to consider the effects of gummata and specific inflammation on the intercranial structures. Or to put it differently, I desire to point out the non-specific lesions that result from the specific ones, and to draw a distinct line of demarkation between them. This distinction is of the greatest practical importance in the prognosis and treatment of every case of brain syphilis. For the one lesion, early in the disease, we have approximately specific medicaments, for the other there is no known method of medication of especial value. Recent gummata at the base of the brain exert pressure on the soft structures and interfere with their functions, the symptoms of the disturbed function depending upon the size of the deposits and their situation. The cranial nerves are compressed and irritated, and the membranes are inflamed. If appropriate treatment is instituted in the early stage, before caseous and fibroid degeneration takes place and before injuries to the structures compressed become well advanced, the whole morbid process may be removed and a cure, so far as the local brain trouble is concerned, is complete. But, unfortunately, vigorous treatment is not always instituted early; it does not take long for compression of nervous tissue to impair the function permanently, although it may not destroy it. Caseous and fibroid degenerations set in early. Although the gummatous substance may be completely absorbed, the fibroid and caseous degenerations lead to the formation of

[5]Gowers; Lettsomian Lectures on Syphilis.

cicatrices and bands of contracting cicatricial tissue. These are non-specific lesions, are not specially influenced by specific medicaments, and remain to compress and throttle the cranial nerves and keep up irritation to a greater or less extent in the membranes and in the brain substance. If, perchance, they remain latent, they mark the situation for subsequent specific inflammation on the application of any of the various exciting causes. It is to these non-specific lesions at the base of the brain, which have resulted from specific inflammation, that many cases of impairment of vision, blindness, ocular paralysis and chronic basilar headaches are due. These, of course, fail to respond to anti-syphilitic agents. Many cases of optic nerve atrophy and of permanent paralysis of one or more ocular muscles may be thus explained, both in children and adults, for it must be remembered that gummata occur as the result of hereditary syphilis, as well as from that which has been acquired.

Gummata on the convex surface of the brain are most likely to occur in and around the motor convolutions. The effects, both from the specific and non-specific lesions, on these structures, the cortex, and membranes are the same as when the inflammation takes place at the base, but the symptoms are different. The same remarks apply to the effects of syphilitic growths within the brain substance. It may be added that intracerebral syphilitic growths are rare and probably arise from some portion of the pia. The characteristic form of specific intracranial inflammation is syphilitic meningitis. It is doubtful whether this form of meningitis, in the true sense of the word, is ever acute. In other words, an apparently acute attack of syphilitic meningitis is secondary to a pre-existing local and chronic specific inflammation of the membranes. If this is true, and I have seen no reason to doubt it, a syphilitic meningitis is always subacute or chronic, although apparently acute outbreaks are not uncommon. Great thickening of the cerebral membranes sometimes takes place from specific inflammation. These thickened areas or patches in the membranes denote chronicity, and in consequence, while they are due to syphilitic inflammation, they are degenerative in character—composed of bands of firm fibrous tissue the results of caseous and fibroid degeneration—and are not purely syphilitic in character. At the base of the brain these

bands of fibrous degeneration are most commonly found in the neighborhood of the optic chiasm and in the interpeduncular space. Syphilitic meningitis involving the convexity of the brain is not infrequent, especially affecting the pia over the anterior and parietal lobes in the vicinity of the longitudinal fissure. According to my experience, when the dura is inflamed in this region the pia rarely altogether escapes; especially have I observed this when the cranial bones of the vault have been inflamed. The pia, on the other hand, is frequently inflamed and the dura remains free. In syphilitic inflammation of the pia the cortex is involved in the inflammatory and degenerative processes. We have a meningo-encephalitis which is partly due to meningitis and partly to degeneration of the arteries of the cortex. Here, again, while the specific inflammation has been mild and the specific exudate comparatively slight, the non-specific lesions are extensive, very destructive, will not respond to anti-syphilitic medication, and hence are permanent in their effects.

There is one other change in the membranes to which I wish to direct attention. This is chronic thickening of the dura in the posterior cerebral fossa. It is commonly found in childhood as the result of inherited syphilis. I have only seen one case of this affection. It occurred in a child about three years of age, the offspring of infected parents. It had been sick for several weeks before it was admitted into the Arapahoe County Hospital. The head was extremely retracted, the body became greatly emaciated, but the patient lived, after it came under my care, one year. At the autopsy the dura of the posterior fossa, especially that portion surrounding the pons and medulla, was thickened and the seat of old fibrous deposits. Some of these cases are said to have recovered. It is just possible that some cases of reported recovery from tubercular meningitis may have been cases of syphilitic meningitis.

Blood vessels in syphilis of the brain. We now pass on to syphilitic inflammation and degeneration of the blood vessels of the brain. Syphilitic endarteritis and periarteritis have been observed and minutely described by nearly every writer on syphilis of the brain, but so little has been said about syphilis of the veins

that I will quote from a case cited by Mickle:[6] "Case i. Female, aged 45; died in an epileptiform attack due to hemorrhage at the brain base, from rupture of a syphilitic vein. There were clear signs of early general paralysis, and tabetiform ones due to diffuse embryonic meningo-myelitis. Syphilitic lesions affected the large vessels of brain and cord. A diffuse vascular lesion affected the cerebral grey cortex, and in a less degree the subjacent white substance."

"The large arteries of the brain present slight patches of ordinary secondary obliterative endarteritis; but the chief lesion is an infiltration of the embryonic cells in the adventitia, forming an intense periarteritis, diffuse, but in places nodular—the first stage of a gummatous process. In the veins the muscular-connective tunic is lesed; in them the infiltration, although usually diffuse, takes here and there a nodular character even more clearly, and so as to form miliary gummata when 'caseification' sets in. The venous lesion exceeds the arterial at the brain base—where it has led to hemorrhage—and at the surface of the cord, and is largely independent of the meningeal and arterial lesion. The endo-vena does not show any proliferation; when it is affected it is so through invasion by the gummatous process. Hence the ulterior tendency of the luetic arterial lesion is to narrowing, obliteration, and their results; of the veins to hemorrhage."

Personally, I have not met with a case of venous hemorrhage due to syphilitic degeneration of the vessel.

Arteries—Gowers, in speaking of arterial degeneration, states that "except in the arteries of the brain and in the aorta, syphilitic disease is scarcely known."[7] In this he is mistaken, as syphilitic degeneration of the spinal arteries is not uncommon.

The walls of the medium, and sometimes of the larger, arteries of the brain are affected by a syphilitic inflammation and a gummatous deposit involving especially the inner coats (the intima and endothelial lining) of the vessels. This process is known as endarteritis, and, on account of the tendency to obliterate the caliber of the affected vessel, is sometimes spoken

[6]W. Julius Mickle, On Syphilis of the Nervous System, Brain, Part I, 1895, pp. 115 and 116.

[7]Gowers, Syphilis and the Nervous System, p. 19.

of as arteritis obliterans. In some cases, before the caliber of the vessel is closed, a small branch given off by the vessel is blocked, and the blood supply to a very small area of the brain may be cut off. If a small artery, especially of the cortex, is thus closed the collateral circulation may be sufficient to prevent necrotic softening; but it may not be sufficient to maintain the normal condition of the part, and this may explain the spots of induration found in the cortex of the brain, especially in syphilitic children. When the caliber of a medium or large vessel is occluded necrotic softening in the area of distribution of the affected artery must take place, as the collateral circulation of the brain is so meager that nature is unable to provide against such violence. It is important to remember that the final closure of the vessel is due, not to gummatous deposits, but to a blood clot formed at the narrowed portion of the vessel. Thus, while the greater portion of the vessel's caliber has been occluded by a specific lesion, the closure is finally completed by non-specific material that is not specially influenced by antisyphilitic treatment. We have then, in all cases of syphilitic occlusion of a vessel, two non-specific lesions: one the blood clot that completes the occlusion of the vessel, and the other the necrotic softening in the area of the brain to which the occluded vessel is distributed. These facts should be borne in mind in the prognosis and treatment of all cases of syphilitic thrombosis.

Gowers states: "A second effect is production of aneurism of the larger arteries, those that are the special seats of the disease."[8] The explanation given for the formation of aneurism is inflammation and degeneration of the vessel wall, by which inextensible fibroid tissue is substituted for the elastic elements.

Mills in his volume on diseases of the brain and the cranial nerves says periarteritis attacks the smaller arteries and may give rise to miliary aneurism and hemorrhage. In a case recently under my observation periarteritis involving the nutrient vessels of the pons resulted in local softening and death. Periarteritis of the nutrient vessels of the brain is not rare, but hemorrhage into the brain substance from specific inflammation of the vessel is infrequent.

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[8] loc cit.

It should be borne in mind that multiple lesions in syphilis of the brain is the rule. It is not uncommon to find most or all of the larger arteries at the base of the brain affected with gummatous deposits. In cases of syphilitic tumors of the brain it is the exception to find the blood vessels healthy. On the other hand the walls of the arteries are often the seat of numerous gummatous deposits, while the other structures of the brain are free from them.

All the degenerative processes, including the nuclear lesions, notwithstanding they may in many instances be due indirectly to syphilis, are non-specific in character, and need not detain us here.

Little is positively known of specific inflammation of the brain substance or of that of the nerves, and I shall pass these structures without further comment.

Symptoms. One of the marked features of syphilis of the nervous system is the irregularity and multiplicity of the symptoms. This or that portion of the nervous structure, unassociated with each other in function, is selected for the attack.

Mickle says: "The selective but unsystematic tendency to picking out this or that portion of the nervous system for its attack, and producing a multiplicity of symptoms of apparently different nervous lesions." He gives Buzzard's views as follows: "The important indications of syphilis are afforded by the multiple character of syphilitic nervous affections and by the coexistence of two or more grave lesions of the nervous system, not necessarily connected."

Hughlings-Jackson thinks: "Random association or a random succession of nervous symptoms is a very strong warrant for the diagnosis of syphilitic diseases of the nervous system." [9]

Gowers believes that syphilitic lesions are never very sudden or very slow or chronic, and never selecting for their attack and isolating structures of a common function.

These guides given by Mickle, Buzzard, Hughlings-Jackson and Gowers for the interpretation of syphilis of the nervous system do not apply to the chronic degenerations and other effects of specific lesions, but only to the symptoms produced by syphilitic lesions themselves. In the study of syphilis of the brain, as well as of other parts of the nervous system, we cannot draw too clear

a distinction between the specific and non-specific lesions of syphilis. Let me illustrate. A specific lesion, a gumma for instance, located at the base of the brain, gives rise to local meningitis, cranial nerve symptoms and, by irritating one crus, unilateral disturbance in motion and sensation; while another gummatous deposit in an artery may give rise to hemiplegia or cortical irritation. Here, then, we have a random distribution of lesions attacking structures not possessing a common function, and, of course, giving rise to a multiplicity of symptoms that can only occur from two or more lesions in unassociated structures. On the other hand, if we take one of the chronic degenerations that result from syphilis, we find the fibers of the posterior columns of the spinal cord are picked out from all the other fibers of the cord. Structures alike in function have been attacked and the symptoms correspond.

The symptoms of syphilis of the brain can best be studied in the light of the nature and seat of the intracranial lesions and their effects. We have found that the meninges of the brain are especially the seat of specific inflammation, and hence for the deposition of gummatous material. We should expect, then, to find headache a prominent symptom. As headache and disorders of sleep go together, it is to be expected that insomnia, or, when pressure is great, somnolency, should be marked symptoms. Again, the base of the brain is the most common site for gummatous deposits, especially early in the history of syphilis of the brain; so that the natural inference is just what we do have—irritation or compression of the cranial nerves at the base. Another common place for the deposit of gummata is on the convex surface of the brain in the region of the motor convolutions and over the anterior lobes; so that motor disturbances, especially in the form of Jacksonian epilepsy in the one instance and mental defect in the other, are the symptoms that we are prepared for.

The walls of the cerebral vessels, especially of the arteries, are frequently the seat of numerous deposits of gummatous material, resulting in occlusion of vessels and softening of the cerebral substance. One or many arteries are affected, although it is rare for more than one to become occluded at the same time.

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[9]Mickle, On Syphilis of the Nervous System, Brain, Part I, 1895, p. 98.

While this is the case, it is important to bear in mind that although only one vessel has been rendered functionless, the function of the entire brain is greatly impaired on account of the number of vessels narrowed. Hence we find a ready explanation for the occurrence of aphasia in left-sided hemiplegia. While the power of speech is located in the left cerebral hemisphere in right-handed persons, and in the right hemisphere in left-handed individuals, and is unilateral in the vast majority of persons, yet there is every reason to believe that language, which is more than simple speech, is bilateral and located in both hemispheres.

From thrombotic occlusion of vessels, cortical or deep seated, hemiplegia or monoplegia is accounted for, with or without sensory or special sense disturbances.

It is of no uncommon occurrence, in fact it is, I have no doubt, a frequent experience with all of us, that within a few hours to a day or more after the development of pronounced paralysis in syphilitic subjects the limbs may in some cases begin to move at will and soon may regain partial or complete power of motion, although there still remains some subjective sensory disturbances and some awkwardness in movements. How are we to account for this rapid return of motor power? We do not find it after hemorrhage; or often after embolus, or thrombus resulting from senile atheroma. To my mind there are three possible explanations; there may be others, but only these occur to me at the present: One is that only a small vessel has been occluded in the motor region, but on account of the disease of numerous other vessels the shock has been so great that immediate and almost complete paralysis has resulted; but as soon as the shock is recovered from, collateral circulation supplies the defective brain area and function of the part is to a greater or less extent resumed. Another possible explanation lies in the fact that the occluded vessel may supply an area just without the motor region, but owing to the crippled state of the general circulatory brain apparatus function is temporarily lost in the adjacent or motor area. The third manner of explaining rapid recovery of function —and this applies to patients that recover motion several days to a week after it has been suddenly lost—is that the collateral vessels to the affected area are diseased, but their calibers are not occluded. They are able to prevent softening of the part until

antisyphilitic medication removes the deposits in their walls, when they can supply sufficient blood to the affected brain area to enable it to resume its function.

Thus far, I have done scarcely more in the symptomatology of syphilis of the brain than mention the most prominent symptoms in connection with the character and location of the lesions to which they are due. The rapidly increasing length of my paper compels me to pass on to the next division of my subject, in which I shall have to refer to headache, the manner of the onset of paralysis, etc.

I cannot refrain, however, from devoting a few words to one class of symptoms—those that relate to syphilitic inflammation of vessels of the brain. This lesion is often the only evidence of intracranial syphilis that we find postmortem. It is, as a rule, rarely attended by much headache. The earliest recognizable symptoms are those that denote beginning mental failure. These are often slight dizziness, especially when the head is moved suddenly; the patient shows slightly increased absent mindedness, he is forgetful, less energetic, and less ambitious than was his wont. He may be at first anxious about himself, but as the trouble increases he is apt to get into a happy-go-lucky frame of mind. This condition, if not treated early, finally ends in hopeless dementia, headache being absent or insignificant throughout the course of the disease, although the patient often becomes restless during the latter part of the day and sometimes maniacal.

Diagnosis[10]—Syphilis of the brain may exist under one or two conditions: One, in which by the most careful and repeated examinations no positive evidence of organic brain trouble can be detected, although it may be suspected; the other in which positive symptoms of organic disease are not lacking.

Headache is a common symptom of direct and reflex brain disturbances. The question may be asked, Does syphilis in the tertiary stage ever give rise to headache in the absence of intracranial syphilis or of the syphilitic virus in the blood? Directly, I do not see how this is possible; indirectly, from the impoverished state of the blood resulting from syphilis, it seems quite

[10]The Justus blood test for syphilis often fails in latent syphilis, in early chancre, and sometimes at the beginning of the secondary stage.

probable. But such a headache could not, so far as I can conceive, differ from headache due to anaemia in general.

Besides the functional or anaemic headache which may occur as the indirect result of syphilis, especially in its tertiary stage, we may have headache either in the secondary or tertiary stages of the disease apparently caused by the virus of syphilis in the blood. In such cases there is no organic change so far as we are able to determine, and the readiness with which the headache disappears under antisyphilitic treatment points to the non-existence of an organic cause for the head pain.

We may have, however, headache due directly to syphilis of the brain, resulting in organic changes, but we may be unable to detect any positive evidence of the organic trouble. How then are we to distinguish between such a headache and one functional in character? In the first place headache due to syphilis with organic changes within the cranium is usually worse during the latter part of the day and in the evening than it is in the morning. This is not because the cause is syphilitic in character, but because it is due to organic changes within the cranium and attended by inflammation, or, at least, to irritation of the intracranial structures. The headache due to nearly all organic changes resulting in inflammation is worse during that diurnal period when the circulation is the most active. I have studied the headaches of persons suffering from brain tumors, both syphilitic or non-syphilitic, and have found them both equally influenced by the diurnal changes, the syphilitic apparently not to a greater degree than the non-syphilitic form. Unfortunately many physicians seem to think because the intracranial lesion is due to syphilis, the increased severity of the headache during the latter part of the day is because the lesion is syphilitic and not because it is inflammatory, or irritative in character.

Occasionally we meet with headache due to the indirect effects of syphilis that do not seem to be much influenced by the diurnal changes. These cases are probably unattended by any active brain changes. I have met with cases of syphilis of the brain in which the headache, or rather unpleasant intracranial sensations, were worse in the early morning, but these cases have been in persons suffering from advanced changes in the cerebral arteries, and were also anaemic. The cephalic disturb-

ances in such cases are naturally most pronounced during that part of the day when the cerebral circulation is least active.[11] I have no doubt that we all have met with such a condition in persons of advanced years with atheroma of the cerebral arteries suffering from insomnia and unpleasant cephalic sensations, to whom a small dose of morphine or codeine administered at bedtime is a sufficient stimulant to induce sleep and a restful night.

In the second place, in headache due to syphilis the organic change is often inflammation of the meninges, and in consequence the pain is very severe and almost constant, and in cases in which the dura of the vault is inflamed there is usually tenderness on pressure.

It is in these cases that the therapeutic test is of inestimable value and soon sets matters at rest.

Disturbances of sleep may be due to syphilis in cases in which no positive evidences of organic brain changes can be detected. Insomnia is often one of the earliest symptoms of intracranial syphilis. It is usually attended by headache of the character due to organic brain trouble. It is not, however, a very frequent symptom of intracranial syphilis. Somnolency need not be discussed in this connection, because when this occurs from syphilis of the brain evidences of organic brain trouble are rarely wanting.

There are many other conditions which might receive attention in this connection, but I will pass on to the

Differential Diagnosis between syphilis of the brain and other organic intracranial diseases. We cannot exercise too much caution in arriving at conclusions in respect to diagnosis. We should constantly bear in mind that upon the thoroughness of our diagnosis depends our skill in prognosis and treatment. The history of the patient, his habits, his hereditary tendencies, the character of the early symptoms, their onset, the chronological order of their development and their subsequent progress should all be studied, analyzed and compared with the greatest care. In searching for a source of infection we should lay more stress upon the character of certain skin eruptions, the history of

[11]We should not forget that some cases of tumors of the brain are attended with anaemia of portions of the brain.

iritis, ulcers in the mouth or throat, and upon the presence of nodes than we should upon scars upon the external genitalia. Mickle states that scars upon the genitals are more likely to be due to non-infecting sores than to specific ones. The absence of the secondary manifestations of syphilis in persons who have suffered from a chancre is in favor of the nervous system suffering in the tertiary state, if this is ever reached. The absence of the history of a chancre in persons who have indulged in indiscriminate sexual intercourse should not influence us much in excluding infection. We should never forget that because a patient has had syphilis the subsequent development of brain trouble by no means necessarily implies that it must be due to syphilis.

After we have made the diagnosis of organic brain trouble, we should endeavor to locate it. The most common sites of intracranial tumor of syphilitic origin are the base of the brain in the interpeduncular space or in the neighborhood of the optic chiasm, on the convex surface over the motor region, occasionally in the pons, rarely in the substance of the brain, and with great infrequency in the cerebellum. We should determine whether the lesion is a tumor, a meningitis, or whether it is vascular in character. If the patient is suffering from epilepsy we should ascertain the age of the patient when the fits first appeared and their character, especially as to consciousness and the extent of the muscles involved during the attack. In hemiplegia the age of the patient is of great importance.

Syphilitic growths. Gowers states that "syphilomata always cause an acute form of optic neuritis, becoming intense."[12] H. C. Wood[13] takes issue with him here, and says that they do not. We may reconcile the statement of each by saying a rapidly growing syphiloma gives rise to acute optic neuritis, and that a slowly growing one may not. The important point to remember is that syphilomata are much more likely to develop rapidly than other forms of intracranial tumors. The most common seat of these tumors is at the base, in which situation they would be recognized by symptoms of meningeal irritation, and

[12]Sir William R. Gowers, Syphilis and the Nervous System, p. 66.
[13]H. C. Wood, Syphilis of the Nervous System, pp. 84 and 85.

various nerve root symptoms. Tubercular growths may occur in the same place, but it is comparatively rare to find other growths similarly situated.

The therapeutic test with proper precautions would be the best means by which to distinguish the syphilitic growth from the tubercular. When the gummata attack the cortex there is no reliable means by which we can distinguish them from the gliomata. Even the therapeutic test often fails us here.

Chronic local syphilitic meningitis, when it attacks the base of the brain, causes nerve root symptoms, especially ptosis; and when the lesion is on the convex surface cortical irritation, especially in the motor region, is common. The therapeutic test is our surest method of diagnosis.

It is of considerable importance to be able to determine the cause of hemiplegia or a monoplegia. Before the forty-fifth year this is not, as a rule, nearly as difficult as it is after atheromatous degeneration of the vessels has taken place. A hemiplegia occurring before the age of forty-five in a patient in whom there is no renal or cardiac trouble, nor blood states likely to form emboli, is, in all probability, due to thrombotic occlusion of a vessel. Disease of the walls of a cerebral vessel before the forty-fifth year to such an extent as to lead to occlusion of its caliber is tantamount to the diagnosis of syphilis. Complete loss of consciousness from thrombotic occlusion of a vessel is rare unless the resulting symptoms, such as complete flaccid paralysis of one entire side, are very pronounced. The therapeutic test in these cases is of little avail. In most cases of hemiplegia of syphilitic origin aphasia is present for a time, even in left sided hemiplegia.

Epilepsy occurring after the thirtieth year, not due to traumatism, exposure to the sun's rays, or to poisons, is probably the result of syphilis or some other intracranial growth. If the convulsions are Jacksonian in character, cortical irritation is quite positive, and most likely caused by syphilis.

I shall not attempt to discuss the diagnosis of the different forms of insanity thought to be due to syphilis.

Prognosis. Mickle gives the general prognosis as follows: One-fourth recover; one-fourth improve greatly; one-half die or exist with grave brain lesions. He states that the prognosis

is worse if the patient is over forty years of age when brain symptoms develop. He gives Hjelmmann as authority for the statement that the prognosis is worse if the development of the brain symptoms is delayed beyond ten years after the initial lesion. He says the most favorable forms are brain irritation, epilepsy, and cranial nerve affections. He states that limb paralysis is less favorable and that severe and diffuse symptoms give the gravest prognosis.[14] The prognosis must be studied in each individual case. It is only by studying the probable character of the lesion in the light of its direct and remote effect upon the structure and function of the brain that we can arrive at anything like an approximately definite conclusion. In all cases of brain syphilis the prognosis is better the earlier antisyphilitic treatment is instituted. The lesion that gives the gravest prognosis when well advanced, syphilitic arteritis, is the most amenable to treatment if this is instituted early. There is no condition more hopeless than pronounced dementia from advanced and diffused syphilitic arteritis. Gummata of the brain, if recognized early and treated most energetically, yield quite readily. If these have existed for some time a complete cure can not be effected; although the gummatous material may be all removed, yet the scar tissue, consisting of the results of caseous and fibroid degeneration, and the injury to the brain from pressure, will be left. These are not specific lesions, and will not yield to antisyphilitic treatment. The damage done to the brain by the presence of the specific deposits can not be cured by specific treatment. Likewise, the clot that has occluded a vessel and the necrosis following the occlusion will not yield to specifics. In a few words, all the effects of specific lesions of the brain, including the degenerations, among which may be mentioned nuclear degenerations of the cranial nerves giving rise to ophthalmoplegia, are non-specific and will not respond to antisyphilitic medication.

Treatment. The more I see of syphilis of the nervous system, and especially of the brain, the more am I convinced that its general management and treatment are more difficult and require greater care than one would infer from reading some of

[14]W. Julius Mickle, Brain, Part I, 1895, pp. 99 and 100.

the articles on syphilis of the brain found in text books and brochures. The manner of giving mercury, or potassium iodid, or both according to the time that has elapsed since the initial lesion, and of giving each to the point of toleration for prolonged periods because the patient is suffering from supposed syphilis of the brain, regardless of the character of the lesion—as to whether it is specific, or the result of syphilis and therefore non-specific—I feel quite confident, to put it mildly, has done as much harm as good.

For convenience the treatment might be subdivided into prevention, general management of the patient, and antisyphilitic medication.

If one and a half to two and a half per cent. of the infected suffer from syphilis of the brain after excluding the cases of paretic dementia and tabes, according to Hjelmmann, and if from twelve to twenty-one per cent. of all who show tertiary symptoms of lues suffer from intracranial syphilis (Hjelmmann and Fournier), should we not attempt to lessen the ravages of this scourge? We find that by active treatment irritative lesions of syphilis may be absorbed and the disease itself held in abeyance for periods of greater or less length of time. Just what the poison of syphilis is we are not in possession of positive information, but it seems fair to infer that the activity of the disease is due directly to developed micro-organisms. These can be killed by treatment, and any micro-organisms in the process of development would probably also be destroyed. Thus the toxines of syphilis are weakened, and their power to develop micro-organisms is destroyed for varying periods. Granting these premises—and they seem to me the logical sequence to be inferred from observing the results of treatment—it appears that we are justified in saying that by proper treatment from time to time we are able not only to destroy the "developed and developing organisms of syphilis," but that we can destroy the activity of the poison itself for the time being, so that no more germs from the syphilitic poison will be developed for a time. Just how long this time of apparent security is, we do not know. What agent seems to meet the demands in destroying these organisms and the activity of the poison? Potassium iodid in from ten to fifteen grain doses thrice daily seems to be en-

tirely reliable. It does not appear to be necessary to continue this treatment more than two or three weeks at one time. Just how long an interval should be allowed to elapse before resuming the treatment we do not know. So far as we know, three or perhaps four months' interval may be allowed before the treatment is again resumed and continued for a period of two or three weeks. Gowers says that potassium iodid in ten grain doses thrice daily should be given for periods of two weeks, three times a year, separating each period of active treatment by an equal interval of time.

We may ask If potassium iodid is so effectual in preventing the development of tertiary lesions of syphilis, how is it we so often see severe syphilitic lesions develop while we are giving this drug in large doses? There are several explanations to meet this query. One is that it is usually easier to prevent than to cure a disease; a second, that when an active and probably multiple brain lesion has developed the vitality of the patient is so reduced that the absorbent vessels fail to respond to the usual stimulant; and yet a third, that large doses of potassium iodid may be given for so long a time that the treatment itself, and not the disease, is responsible for the depressed condition of the patient. It has been observed over and over again that the greater the depression and the less the vitality of the victim the greater the ravages of syphilis.

General Management. It is not necessary to go into details under this subdivision of the treatment. What Professor H. C. Wood terms the accidents of syphilis, such as apoplectiform attacks, hemiplegia, coma apparently from cerebral congestion, and convulsions should receive attention, and be treated as such conditions are when they are not the result of syphilis. While I simply desire to call attention to these complications or accidents of syphilis, I wish to give a warning in this connection. It is *not* safe to postpone antisyphilitic treatment in these cases until the "accidents" have been relieved, but specific medication should be instituted at once in proper cases.

According to my experience it is rare in private practice, either personal or consultant, to meet with cases of syphilis in which emaciation is great and anaemia pronounced; but in hospital work, especially in institutions devoted to charity alone, it

has not been uncommon for me to meet with such cases. It is often worse than useless to treat some of these patients at first by specific medication. What they need and must have before specifics will act, are stimulants, tonics and an abundance of nutritious food. In other cases, in which anaemia and loss of flesh are less marked, specific medication and a tonic course of treatment should be begun at one and the same time.

Antisyphilitic Treatment. When shall we give mercury or potassium iodid, and when shall we administer both for the relief of intracranial syphilis? I do not believe that the time that has elapsed since the initial lesion was contracted is any guide. My experience has been that the activity of the syphilitic process is the most, yea, so far as I know, the only guide to the choice of mercury or potassium iodid. The greater the activity of the poison, the more acute and violent the symptoms, the greater the demand for mercury. On the other hand, potassium iodid apparently does more good in the chronic specific processes than does mercury. I do not wish you to infer that mercury does no good in chronic syphilitic lesions and that potassium is useless in the active and acutely irritative ones. On the contrary, I believe that each may be indicated in almost any stage of intracranial syphilis, but when it is a question under which drug's influence we must first seek to bring our patient, then the acuity or chronicity of the syphilitic inflammation should guide us.

I shall not discuss the details of the treatment; each has his favorite prescription and method of administration. We should, however, when we have syphilitic inflammation or deposits to be gotten rid of, push specific medication to the point of tolerance. The results of treatment and not the dose of potassium iodid or mercury should be our guide. In a few cases of active specific lesions of the brain I have given with great benefit one-half grain of bichlorid of mercury thrice daily. In one instance it required 1060 grains of potassium iodid daily to accomplish the desired result, but these are rare and exceptional cases.

Before closing I wish to direct your attention once more to the intracranial lesions of syphilis and their effects on adjacent structures. We found that gummata were specific in character, and when attacked early yielded readily to antisyphilitic treat-

ment; that they soon began to degenerate, each gumma showing spots of degeneration of a caseous or fibroid nature; that the final results of the degeneration of the gumma were not specific in character and showed no tendency to yield to antisyphilitic treatment; that the cicatricial tissue left by the degeneration, although the gummatous material was all absorbed, formed scars in the brain on its cortical surface or bands at the base, in the latter situation often giving rise to destruction of the cranial nerves, causing blindness, ocular paralysis and various cranial nerve symptoms, all of which are not relieved by specific medication. We found that specific meningitis yielded to treatment, yet a thickened condition of the membranes remained, giving rise to basilar or convex cortical symptoms, in the one instance as evidenced by cranial nerve disturbance, in the other by motor and mental manifestations of a perverted character; that a meningo-encephalitis was sometimes developed, although due to syphilis, yet the destructive lesions were not specific in character. Again, we found a specific inflammation in the walls of the blood vessels caused a narrowing of the arteries, but that their final occlusion was the result of blood clot, non-specific in character, and that the softened brain area was non-specific, although indirectly due to specificity. Finally, the chronic degenerations are non-specific in their character and do not yield to antisyphilitic medication.

What lessons should we learn from a study of the intracranial lesions of syphilis and their results? First, that for a certain time antisyphilitic agents may be given to the point of toleration for the removal of gummata; secondly, that there are numerous non-specific intracranial lesions resulting from specific causes, but which fail to yield to specific medication.

How pitiable it is to see a hemiplegic or a dement whose helplessness has been caused by thrombotic occlusion of a vessel, indirectly due to syphilis, treated at this place or at that by courses of mercury; or, equally as bad, by large doses of potassium iodid for many months, or even a year, at a time. When will the profession learn to treat syphilis of the brain according to the lesion from which the patient is suffering? Should we not learn to have some regard for our patient, notwithstanding that he is so unfortunate as to be the victim of syphilis?

OCULAR MANIFESTATIONS OF SYPHILIS.

BY EDWARD JACKSON, M. D., DENVER, COLO.

It should be remembered that the initial lesion of syphilis may occur upon the lids or conjunctiva. History of contamination is usually wholly wanting, and the sore is characterized by a slow course, great swelling and induration, and comparatively little pain.

Iritis is usually a secondary symptom, but its sequels may be looked for to throw light upon the diagnosis at a later stage. Too much importance is readily attached to their presence or absence. Between 40 and 50 per cent. of all cases of iritis are not of syphilitic origin, and of all cases of syphilis, but 3 per cent. suffer from iritis. Brunson (*Ophthalmic Record*, November, 1899), thinks of well-treated cases of syphilis not more than one in five hundred would suffer from iritis. Even if iritis has occurred, if properly treated from the onset it will probably leave no trace in after years; and if untreated, all evidence of its occurrence may, in time, disappear. So, if a patient presents no sequels of iritis it is no indication that he has not had syphilis. If he has had iritis, it is nearly an even chance whether he has had syphilis or not.

Iritis does also occur as a tertiary lesion, in connection with gumma of the iris, with interstitial keratitis, and even without notable lesions of the cornea. A chronic form of iritis, affecting especially the periphery, and closing the filtration spaces at the angle of the anterior chamber, ends in syphilitic glaucoma, usually many years after infection.

Interstitial keratitis is not always syphilitic. But the typical cases, with salmon-colored patches of vascular loops running out from the corneal margin, and opacity slowly increasing, and slowly clearing up from the periphery toward the center of the cornea, are always of this origin. These typical cases commonly occur in the childhood or youth of victims of inherited syphilis. But they may occur later in life. Interstitial keratitis also occurs late in acquired syphilis, but all such cases that I have seen were more or less atypical cases. Interstitial keratitis, even when oc-

curring in a patient clearly suffering with inherited syphilis, may be closely associated with some other dyscrasia. I have seen it evidently thus related to acute articular rheumatism. Gumma of the cornea may occur in the course of interstitial keratitis. Gumma of the ciliary region may lead to the permanent thinning of the sclera, and staphyloma.

It is rather striking that a disease which affects so widely structures of epiblastic origin does not appear to be a special factor in the causation of cataract. Cataract does occur in syphilitics, sometimes by mere coincidence, but sometimes as a result of extensive disease of the uveal tract, upon which the nutrition of the crystalline lens depends.

The transparency of the vitreous suffers more frequently, the typical lesion being the dust-like opacity, and often this appears without any certain evidence of lesion of the uveal tract. But choroidal lesions are generally, and perhaps always, present. Lens opacities appear when the uveal changes are of long standing, and have given ample opportunity for their previous recognition. Vitreous opacities come with the first onset of the choroidal disease, and may never clear up sufficiently to reveal the latter, or may do so only after a long time when the patient has passed from under observation.

The syphilitic lesions of the choroid are varied and usually not characteristic. But they all include, when fully developed, disturbances of pigment, its massing in black spots or blotches, and removal from areas of partial atrophy. When these spots are small, rounded, and scattered throughout the fundus, I have thought them most characteristic of this disease. But the lesions of syphilitic origin may run by all intermediate forms into the most typical appearances of choroido-retinitis or retinitis pigmentosa.

Syphilitic choroido-retinitis comes on during the secondary period, but continues well on into the tertiary stage. Its speckled fundus, specks or membrane of grayish exudate, dust-like opacity of the vitreous, which later disappears, impairment of the vision and opaque nerve head, are very characteristic. The share of inherited syphilis in causing retinitis pigmentosa is still uncertain, but a few cases presenting the same retinal lesions, and com-

mencing later in life, commonly near middle age, are clearly due to acquired syphilis.

Optic neuritis and neuro-retinitis are sometimes tertiary lesions of syphilis. In one case I saw them three months after the initial lesion cotemporaneous with the first eruption, and followed a month later by iritis. The appearance and clinical course of the case does not reveal its origin, but the vigorous trial of anti-syphilitic treatment will.

Tarsitis, dacryo-adenitis, and gumma of the orbit occur, and there is a form of chronic tertiary ulcer of the lids or conjunctiva, with great swellings of its margins, which only treatment will differentiate from malignant disease.

Sixty per cent. of the palsies of the ocular muscles are due to syphilis. But these depend on brain or nerve lesions. Finally, in the treatment of the ocular lesions of late syphilis, mercury must still be regarded as essential.

TERTIARY MANIFESTATIONS OF SYPHILIS OF THE EAR.

BY P. F. GILDEA, M. D., COLORADO SPRINGS, COLO.

One hesitates to write anything on the above subject, since he is confronted by the fact that authors, the few who have written on this subject, fail to give any symptoms which are peculiar to disease of the middle ear. Sudden deafness is brought prominently forward as a symptom of this trouble, and yet how many diseases, even those where the symptom is bilateral, are characterized by this sign. When one meets with this symptom, even where the patient has the disease in other parts, one is left in doubt whether the ears are involved at all, or whether one has to do with a lesion in the floor of the fourth ventricle. The distinction made by some writers in separating this disease from tuberculosis of the ear, that in tuberculosis the drum is more pale,

is of very little value, because we may have a combination of an acute catarrhal condition with either syphilis or tuberculosis of this part. The same may be said of other given symptoms. The cases I have had in which I was comparatively sure of my diagnosis have been few, as in the routine of hospital work and of private practice the earlier manifestations in the nose, throat, or lung are so much more prominent that the ear is apt to be overlooked. Men like the late Prof. Gruber, Prof. Pollitzer, and others who have control of a large amount of material, claim to have seen characteristic mucous patches in the middle ear, that gummata exist, and that specific treatment has produced results as definite as those obtained in other parts of the body. Personally, I have no reason to doubt their statements, for although I was not able to follow any individual case to the end, yet the cases shown to me were convincing, though few. The cases which in ordinary ear practice show evidence of syphilitic taint are those in which the ear lesion is so very slight that there seems to be no definite symptom to treat beyond slight deafness, tinnitus, or other subjective signs. Examination of the middle ear shows very little except a retraction of the drum, some slight closure of the eustachian tubes, and other signs of hyperplasia. Inflation of the middle ear does not increase the hearing, neither does it stop other uncomfortable symptoms. Treatment in these cases is of no avail unless iodine in one of its forms be introduced into the middle ear, with pilocapine hypodermically, or iodide of potassium, or mercurial inunctions. These cases are not, as a rule, attributed to constitutional taint, and yet I am inclined to believe that they are as much so as ulcer of the cornea or any skin diseases.

The purpose of my short paper to-day is to advocate the thorough trial of anti-specific remedies in obscure ear trouble as often as in obscure diseases of other organs. I have often wondered why the aurist does not make use of Justus' procedure for the early detection of a constitutional cause for some of the obscure cases in his line as any of the other specialists, especially since the technique has been so simplified that a man with ordinary laboratory training can make use of it. I believe the near future will see the placing of this method by the side of Ehrlich's diazo-reaction and Widal's test. I have not mentioned syphilis

of the external ear, as it is most often in the province of the skin specialist; or that of the internal ear, since this region of usual shadow becomes at once involved in dark, impenetrable night.

TERTIARY SYPHILIS OF THE NOSE.

BY ROBERT LEVY, M. D., DENVER, COLO.

According to Sir Morell Mackenzie, syphilis of the nose was recognized and described as early as 2600 years B. C., by a Chinaman. The recognition of nasal lesions in conjunction with what is now known to be syphilis has been spoken of by innumerable writers and historians from that early date down to the present time. It is largely tertiary syphilis that has attracted attention, inasmuch as the symptoms of primary and secondary lesions are of comparatively slight duration and severity, leaving but trifling if any after effects. It is also this form of syphilis which manifests itself in the disease due to heredity, and, therefore, a description dealing with tertiary syphilis in general will answer for that known as congenital as well as that recognized as acquired.

The importance of tertiary syphilis of the nose is not only in the lesions and deformities of this organ, but according to Jouslain[1] it often indicates a predisposition to and possibly the commencement of manifestations in deeper structures.

According to Schech[2] the *frequency* with which nasal syphilis occurs is subject to considerable difference of opinion among different authors. Thus he quotes Mauriac, who found pharyngo-nasal syphilis in 237 cases of the tertiary lesion, and Willigk, who only found 2-8/10 per cent. in 218 cases. According to Schubert,[3] in 7,000 cases of ear and nose diseases, 42 were found to present syphilitic manifestations, and, of these, 30 cases belonged to tertiary lesions. It has been shown by Michelson[4] that those cases whose early manifestations were not treated by mercury were by far the most likely to develop tertiary lesions.

The time of onset may be anywhere from a few months after the infection to many years. Mauriac, quoted by Lang,[5] describes a case of necrosis of the bones in the seventh month of syphilis. In hereditary syphilis, tertiary manifestations may appear as early as the third month (Kyle[6]), while the most frequent time for their appearance according to nearly all authors is the age of puberty.

The typical and usual *pathological lesions* of tertiary nasal syphilis are those of gummatous deposits followed by deep ulceration, caries, necrosis and the development of characteristic cicatricial tissue. These lesions may be found in and upon various portions of the nose. The septum, it seems, is the most frequent site. The external nose, both skin and bone, not infrequently, however, are involved in the destructive process.

A condition called "acne syphilitica," and described by Horaud[7], is characterized by the appearance of pustules covered with black crusts, scattered irregularly over a dark red thickened skin.

External gummata are described by Schech[8] and Lang. Unusual external manifestations resembling lupus have been noted, and this condition has been called "lupus syphiliticus."[8] Cases of this description are spoken of by Cohen,[9] McBride,[10] Schech,[11] Wolfenden[12] and others. A somewhat similar condition is described by Bulkley[13] as "tubercular syphilide."

It has generally been believed that swelling of the nasal mucosa, either over the septum or the turbinate bodies and occurring as a tertiary manifestation, always indicates more or less gummy infiltration, which necessarily leads to caries and necrosis. I am convinced from the observation of a number of cases that while swelling of the septal mucous membrane of a peculiar edematous character without traumatic cause is a manifestation of syphilis, it may, nevertheless, subside without ulceration or necrosis. While this may be a rare form of the disease, cases other than my own have been recorded by Noquet[14] and Dinisio.[15]

Swelling within the nasal cavity other than simple tumefaction of mucous membrane, and differing in their histology from true gummata, may at times be seen. These growths have been termed "granulation swellings"[16] and "syphilomata."[17]

Necrosis of bone or cartilage does not always result simply from infiltration and subsequent destruction of the mucous membrane and periosteum covering these structures. It has been abundantly shown that gummatous deposits may find a primary lodging in bone itself,[18] and it is in these cases that most extensive destruction occurs and that explains the apparent transgression of anatomical boundaries.

The most common deformity seen is perforation of the nasal septum, either cartilaginous or bony, or both. It is well, however, to remember that septal perforations are not by any means most frequently caused by syphilis. They are often the result of catarrhal erosions, frequently follow hemorrhagic and other debilitating diseases (Lennox Browne[19]). According to McBride[20] perforations of the bony septum may be usually considered as syphilitic, while the experiments of Hajek[21] tend to show that necrotic processes in the cartilaginous septum may be caused by streptococci and staphylococci.

As the destructive processes go on we find most extensive lesions, necrosis of the entire contents of the nasal cavities having been noted in not a few instances. Opening of the interior of the nose through the roof and upon the surface has been described by Schech,[22] and DeBlois[23] has called attention to the dangerous complication of necrosis through the nasal fossa into the antrum.

We thus see with what a variety of peculiar tertiary lesions syphilis may manifest itself, and the *symptomatology* will vary according to the nature and site of the lesion. Pain as a rule is not a prominent symptom; it may occur either from pressure in the preulcerative stage of gumma or from periostitis. A case came under my observation in which the pain was so intense as to demand large doses of anodynes in spite of most vigorous anti-syphilitic measures. In this case extensive gummatous infiltration was found in both middle and inferior turbinate bodies upon the left side. Nasal obstruction, due either to swelling or later to the accumulation of necrosed tissue, bone or soft parts, is a more or less common symptom. As soon as necrosis sets in, bloody, purulent and scabby discharges occur. Coincident with these is intolerable and characteristic fetor, which is distinguished from all other odors by its intensity

and by the fact that it does not disappear after most thorough cleansing of the nasal cavity.

Of greatest importance as well as of greatest difficulty at times is the *diagnosis* of syphilis of the nose. Gummata of the nose break down slowly and after considerable period of time, but having once begun their ulcerative processes it is often difficult to stop the ravages they produce and to prevent such destruction of tissue as will result in hideous and characteristic deformities. The early recognition of this condition should therefore be insisted upon, and we find that it is not difficult to mistake lupus, various tumors and foreign bodies for syphilis, and vice versa. The use of the probe is often of great help. One should always reinforce rhinoscopic examination by attempting to locate necrosed bone with a blunt probe. The microscope will frequently be necessary to clear the diagnosis as between gumma and malignant tumor, but too much reliance should not be placed upon microscopic examination. The history of an initial lesion with the usual secondary phenomena will also aid us, but should not pervert our judgment in the recognition of other conditions in a syphilitic subject, nor should the absence of history be made too prominent a factor against the existence of syphilis, for in my experience it is just in the obscure cases that we fail to obtain even the faintest suspicion of infection.

My case records show a number of instances in which the diagnosis was sufficiently in doubt to deceive men of the highest standing in the profession. I desire to place on record the following:

Case I. Female child, age 5 years, appeared at the Gross Medical College dispensary suffering from diffuse keratitis. The child being a foundling, the diagnosis of congenital syphilis as a cause of the keratitis seemed well founded and anti-syphilitic treatment was at once instituted. Within a few days the child was referred to the throat department for a sanious, very foul smelling discharge from the nose. A superficial examination was sufficient to convince me that the child was suffering from nasal syphilis, this diagnosis being confirmed by the history and the condition of the eye. While the keratitis and the general condition of the child improved under mixed treatment, the nasal symptoms did not abate and the foster mother, becoming dis-

couraged, took the child to an advertising specialist, who quickly removed the cause of all trouble by extracting from the child's nose a shoe button.

Case II. Mrs. G., age 35, complains of sharp spasmodic pains in the left side of the nose, high up and radiating to the forehead and ear. There is a moderate amount of bloody discharge of a not very offensive character. She has never had a child, nor any miscarriage; gives no history of syphilitic infection or of secondary manifestations, notwithstanding a most

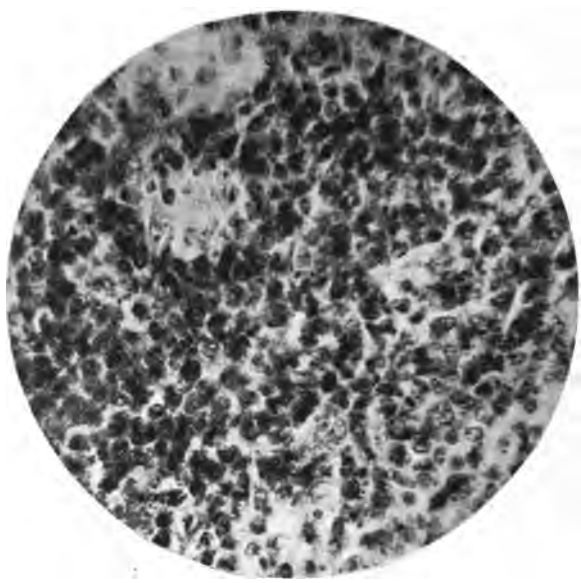

FIG. 1. PHOTOMICROGRAPH BY DR. A. M. HOLMES.

painstaking cross examination. The examination of the nose reveals a small dark red tumor of irregular outline springing from the region of the middle turbinate. No evidences of necrosis or ulceration are present. The tumor bleeds easily upon touching with a probe. The question of diagnosis resting between syphilis and malignant growth, a portion was removed with a cold wire snare and submitted to two thoroughly competent pathologists. The report of both agreed that the case was one of small round cell sarcoma. (Fig. 1.) The patient was informed of the serious nature of the disease and under the influence of the gravity of the

case was urged to recall any possibility of syphilitic infection. The result was entirely negative and the patient was advised to go to the hospital, where it was proposed to perform a radical operation for the removal of the growth. This was agreed to, but on account of certain domestic affairs two weeks were given the patient for preparation. Thinking it well to employ our two weeks in doing something, I placed the patient upon mercury and iodide of potash, with the result that in less than the time given the symptoms had all abated and the tumor had nearly disappeared. The patient subsequently developed other unmistakable evidences of syphilis, all of which yielded promptly to proper medication.

Case III. Mr. J. S. J., age 33, unmarried. Presents a most disfiguring appearance of the nose. About three months before the time of my examination small pimples began to appear on the end of the nose which gave no pain, but which rapidly broke down leaving small superficial ulcerations; history of syphilis ten to twelve years ago. Patient placed himself at once under the care of one of the most prominent rhinologists in the United States, a man whose work on diseases of the throat and nose is a recognized authority. The diagnosis of lupus was made and treatment instituted. Slight improvement occurred from time to time, but upon the whole the disease made decided progress. Another celebrated rhinologist saw the case and coincided in the diagnosis. Upon the 23rd of August, 1899, I found the following condition: The entire external nose was red and swollen; moderate sized ulcerations with a dark red areola were irregularly scattered over the movable portion. There were here and there a few faint white scars, and upon the alae and columna, and penetrating to the septum, small nodular elevations. The septum itself was slightly swollen and nodular upon both sides. Disregarding the diagnosis previously made, the patient was placed upon mercury and iodide of potash, with such rapid improvement that no question as to the diagnosis could be tolerated.

Case I may be unique, and the error which I fell into would probably have been avoided had I been more careful in the first examination. I have since seen a case of a child whose appearance gave every indication of profound dyscrasia, probably syph-

ilitic, with foul smelling discharge from the nose, due also to a foreign body which was readily removed.

Case II has not a few associates in medicine, fibromata or sarcomata having been diagnosed by the microscope in the cases of Knight,[24] Kuttner,[17] Frank[25] and others.

Case III presents the difficulty in differential diagnosis between lupus and syphilis, and recalls the peculiar conditions described as lupus syphiliticus, tubercular syphilide and acne syphilitica, above referred to.

In considering the *prognosis* of tertiary nasal lesions, we take into account the early recognition of the disease, the possibility of extension to vital structures, the extent to which the destructive lesion has gone on, the development of characteristic cicatrices, and the resultant deformities. It is a well recognized fact that when gummatous lesion has once begun its inroad upon the nasal contents and ulceration has set in it is with difficulty checked. When, however, the disease is recognized before liquefaction of the gumma and necrosis have started, proper local and general treatment may be found to avert serious sequelae. The possibility of extension to the cranial contents is spoken of by Mackenzie.[26] The disease having been brought under control, necrotic tissue is discharged and scars of a peculiar contractile character mark the site of former destruction. When these scars are seen upon the surface of the nose they take on a stellate appearance which is characteristic. They may develop on the interior in such a way as to more or less completely occlude the nasal passages, as in the case of Mayer.[27] A great variety of deformities result usually from two causes: actual destruction of the nasal septum and adjoining structures, and the contraction of the cicatricial tissue itself. Should the nasal bones be destroyed the saddle nose will result. This is not due to destruction of the septum as has so frequently been thought (Thompson,[28] Schech[29]). A peculiar deformity which we find alluded to in Heymann's Handbuch,[30] and which I have frequently observed, occurs in cases of extensive atrophic rhinitis—a condition known as Kneifernase. In this deformity there is a depression at the junction of the bony with the cartilaginous nasal framework which is more marked laterally and which is due to

distinct atrophy within. This should not be confounded with the saddle nose or the lorgnette nose of syphilis.

The *treatment* should be prophylactic, local, and general. By active measures early carried out, one may avoid much of the hideous deformities resulting from destruction of tissue and contraction of scars. Mercury and iodid of potash should be actively administered; properly constructed tubes may be inserted to avoid adhesions and the nose may be supported by an artificial bridge (Kyle,[31] DeBlois[32]). Should necrosed bone be detected we should attempt its removal, provided, of course, the sequestrum is well separated. Mackenzie,[33] DeBlois,[32] Schech[34] and Hellmann[35] have called attention to the dangers of curetting too early or too vigorously. The sharp Volkmann spoon should be used, however, whenever necrosis has resulted to such an extent that the sequestra may with slight difficulty be removed. Gummatous deposits may be left to the action of internal remedies unless of such a size as to interfere with the functions of the parts. It may become necessary to crush a large sequestrum (Fig. 2.) before its removal from a narrow nasal fossa, and at times the snare will be found a useful aid. Rouge's operation has at times been undertaken in instances in which it was impossible to effect the removal of sequestra by the natural openings. Besides operative local treatment, much may be done for the comfort of the patient by thorough and frequent cleansing with a warm 1 per cent. solution of potassium permanganate, the application of tincture of iodine, and the insufflation of iodoform. Perforations should be treated by cauterizing their margins and applying an ointment of calomel and europhen, each 20 grains, vaseline one ounce.

FIG. 2.

Here, as in other syphilitic manifestations, very great attention should be paid to constitutional treatment. As a general thing, mixed treatment is to be advised, and both mercury and iodid of potassium should be given in gradually increasing doses and to the full limit. The effect of potassium iodid may be largely enhanced by combining it with other iodids, notably iodid of strontium, ammonium and sodium. Much has been done toward the correction of resultant deformities by plastic surgery, and the introduction of artificial bridges. The removal of ex-

ternal scars may be at least partially accomplished by certain heroic measures which have for their object the destruction of the scar tissue and the stimulation of the surrounding skin.

REFERENCES.

[1]Journal of Laryngology, Vol. X., p. 254.
[2]Handbuch der Laryngologie und Rhinologie, Heymann, Band III, p. 931.
[3]Muenchn. Med. Wochenschr, No. 19, 1893.
[4]Handbuch der Laryngologie und Rhinologie, p. 932.
[5]Twentieth Century Practice, Vol. XVIII, p. 129.
[6]Diseases of the Nose and Throat, Kyle, p. 134.
[7]Lyon Med. 16, Oct., 1887, ref. Intern. Centrlblt fur Laryn, u. Rhin., Sept., 1888, p. 100.
[8]Handbuch der Laryngologie und Rhinologie, Heymann, p. 938.
[9]Diseases of the Throat, p. 293.
[10]Diseases of the Nose, Throat and Ear, p. 286.
[11]Handbuch der Laryngologie und Rhinologie, Heymann, p. 939.
[12]Journal of Laryngology, Sept., 1889.
[13]System of Diseases of the Ear, Nose and Throat, Burnett, Vol. II, p. 189.
[14]Intern. Centrlblt. fur Laryn. u. Rhin., Feb., 1892, p. 306.
[15]Journal of Laryngology, Vol. XII., p. 146.
[16]Handbuch der Laryngologie und Rhinologie, Heymann, p. 943.
[17]Archiv. f. Laryn. u. Rhin., Band VII., p. 274.
[18]Lang, Twentieth Century Practice, Vol. XVIII, p. 129.
[19]Throat and Nose and Their Diseases, Lennox Browne, 4th Edition, p. 591.
[20]Op. cit., p. 286.
[21]Twentieth Century Practice, Vol. XVIII, p. 133.
[22]Handbuch der Laryngologie und Rhinologie, Heymann, p. 943.
[23]Trans. Am. Laryn. Ass'n, 1889, p. 75.
[24]Knight, Trans. Am. Laryn. Ass'n, 1896, p. 151.
[25]Frank, Ref. Intern. Centrlblt. fur Laryn. u. Rhin., July, 1895, p. 694.
[26]Mackenzie, Oesophagus, Nose and Naso Pharynx, 1884, p. 277.
[27]Mayer, N. Y. Eye and Ear Infirmary Reports, June, 1893.
[28]The Laryngoscope, Vol. IV, p. 19.
[29]Handbuch der Laryngologie und Rhinologie, Heymann, p. 941.
[30]Op. cit., p. 946.
[31]Trans. Am. Laryn. Ass'n., 1896, p. 132.
[32]DuBlois, Trans. Am. Laryn. Association, 1889, p. 75.
[33]Op. cit., p. 280.
[34]Op. cit., p. 949.
[35]Arch. f. Laryn. u. Rhin., Band III, p. 210.

SYPHILIS OF THE THROAT.

BY THOMAS J. GALLAHER, M. D., DENVER, COLO.

In our limited time, it is our purpose to briefly discuss syphilis of the fauces, pharynx and larynx.

In the fauces, syphilis manifests itself in the three commonly accepted stages: primary, secondary and tertiary. In this region the initial lesion is found most frequently on the tonsil. Chancre of the tonsil was at one time considered extremely rare, owing, no doubt, to its having been overlooked; but since better attention has been paid to the throat, statistics show that it is becoming more common. Taylor, in his late work on syphilis, reports eighteen cases of primary chancre of the tonsil. The tonsillar tissue varies in different individuals, being smooth or rough according to the amount of hyperplasia which may be present, and the appearance of the chancre is correspondingly modified. As in other parts of the body there will be as many initial lesions as there are distinct points of inoculation. Taylor reports several cases in which the lesions were found in both tonsils, and one case in which not only both tonsils were involved, but the posterior pharyngeal as well. Dr. W. P. Munn, of this society, reports a case of simultaneous appearance of chancre on the tongue and tonsil. Chancre on the tonsil never presents a definite typical appearance. Examination will reveal early in its course that the chancre is hard, in some cases distinctly circumscribed, in others diffuse, involving not only the entire tonsil but the peritonsillar tissues. On its surface it may be but slightly red. In a short time it will show a sluggish ulceration covered with a membrane, presenting an appearance somewhat like that of a mucous patch. It must be remembered that the tonsil is made up of lymphoid tissue, richly supplied with blood vessels and lymphatics; hence we would naturally expect that a chancre in this region would vary considerably in its characteristics from a chancre occurring on the skin or on an ordinary mucous membrane. The tissue changes in extra-faucial chancre are confined mostly to the epithelial layer, while in the tonsil the cellular infiltration

not only involves the superficial structures, but proceeds along the course of the lymphatics and smaller blood vessels, involving a much larger area and extending deeply into the gland. Owing to the reasons mentioned above, chancre of the tonsil is quite large and characterized by considerable destruction of tissue. The earliest symptom is painful deglutition, which persists regardless of treatment. Enlargement of the tonsil continues and very soon the sub-maxillary and cervical glands become enlarged corresponding to the affected side.

Erythema of the fauces, occurring early in the secondary stage, consists of a passive hyperemia producing a dark red color but with no perceptible swelling. As a rule there is a sharp line of demarcation between the hard and soft palate. This manifestation in the fauces is perfectly analogous to the cutaneous eruption.

The mucous patch, although occurring most frequently in the early stages of the disease, may occur at any period. It is similar in structure to the initial lesion, there being at first a round cell infiltration in the deeper layers of the mucous membrane with serous exudation, and more or less erosion of its surface presenting a necrotic appearance. Exclusive of the tongue and the mucous surfaces of the lips, it is found most frequently on the tonsils, uvula, velum palati and its pillars. Occurring upon a hypertrophied tonsil a mucous patch is often accompanied by so much infiltration and the parts are subjected to so much friction incidental to deglutition that considerable ulceration may result.

Gumma of the fauces is not infrequent and it should be pointed out that it is sometimes precocious, developing as early as the fourth or fifth month after the appearance of the initial lesion. I have lately seen a case with a clear history in which gumma of the soft palate occurred four and one-half months after the appearance of the chancre, which almost destroyed half of the soft palate. It has been commonly taught that gumma only appears in the later stage of this disease, but our syphilographers are now convinced that especially in the fauces, gumma occurs much earlier than was formerly supposed. Many of the so-called superficial ulcerations in the fauces are nothing more nor less than the breaking down of gummatous deposits. It is of the utmost importance to diagnose a gumma in this region, as the

rapidity of the breaking down may be so great as to destroy the integrity of the palate, producing the usual serious consequences to the patient. The recognition of a gumma in its early infiltrative stage is sometimes difficult, it not being painful although hard and resisting. It must be diagnosed from benign and malignant tumors and from acute and chronic inflammations. Indeed, its character may not be definitely determined until after the therapeutic test is made.

Deep ulcerations of syphilis caused by the breaking down of a gumma are easily diagnosed, characterized by a well-marked areola with the surface of the ulcer markedly depressed below the surrounding mucous membrane and covered with more or less secretion of pus. With the exception of the ulcerations of tuberculosis and lupus, all ulcerations of the fauces should be regarded as extremely suspicious as manifestations of syphilitic infection and in an overwhelming majority of instances will be found to be such. It will be necessary to diagnose syphilitic ulceration from that of tuberculosis and lupus. The following cardinal points will suffice:

Syphilitic Ulceration—	*Tubercular Ulceration—*
Deeply excavated.	No apparent excavation.
Bright red areola.	No areola.
Sharply defined.	No well-defined edges.
Bright yellow purulent discharge.	Grayish mucous discharge.
Free discharge.	Scant discharge.
Rapidly destructive.	Slowly destructive.
Extends deeply.	Extends laterally.
Constitutional disturbance not marked.	Constitutional disturbances marked.

In lupus there is no excavated surface, no yellowish ulceration, no pus-secretion, and no areola. Lupus progresses very slowly.

Syphilis attacks the pharynx in all its stages. The erythema is very frequent, while the mucous patch is singularly rare. Gummatous deposits and the resulting deep ulcerations occur commonly in this region. The points for differential diagnosis are precisely the same as those for the fauces and need not be repeated.

In the larynx syphilis occurs in the primary, secondary and tertiary stages. Moure reports one case of the initial lesion occurring on the epiglottis, which was followed by the usual manifestations. Syphilitic erythema is rather frequent. The mucous patch, according to some observers, does not occur in the larynx, but it is the consensus of opinion among laryngologists that it undoubtedly occurs and is simply overlooked. Bosworth describes two forms of ulceration in the larynx—superficial and deep. He states that the superficial ulcer may develop from a mucous patch, or be primarily the result of the breaking down of a superficial gummatous infiltration. Indeed, the mucous patch, superficial and deep ulcerations are essentially the same in character, the difference being only in degree. In the mucous patch the infiltration is in the epithelial layer of the mucous membrane, while in the ulcerations the infiltration extends more or less deeply and involves a greater area. The gumma is found in two varieties in the larynx: presenting as a distinct tumor or tumors, or as a diffuse infiltration. As in the fauces the gumma on breaking down leaves the deep ulceration which is so characteristic. The cicatrization following may produce considerable stenosis. The diagnosis of syphilis of the larynx is practically the same as that of the fauces, remembering the slight modifications which the histological structures would naturally make. In conclusion, I desire to say that owing to the limited time, it has been impossible for us to more fully discuss this subject.

BONE AND JOINT SYPHILIS.

BY W. W. GRANT, M. D., DENVER, COLO.

Syphilis of the bones and joints is not, as might be inferred by some, a disease only of the late or tertiary form. Disease of the epiphyses and synovitis are not very infrequent, even in secondary syphilis, and especially when not treated early and

properly. It is doubtless true that many cases of bone and joint syphilis, both hereditary and acquired, are treated as tuberculosis. It is important to make the distinction, and yet at times it is not easy.

The smegma bacillus and the Lustgarten and Koch bacilli resemble each other so closely that, as in the case of the colon and Eberth bacilli, only one well-versed in the pathology and the use of the microscope can satisfactorily determine their character and nature, respectively, and this is not always practical or feasible. If there is a tubercular tendency or predisposition in a syphilitic subject, severe nasal, as well as other bone lesions, are more certain to occur. Necrosis and deformity of nose frequently result and with these manifestations the profession is quite familiar. If hereditary, the palate is not infrequently involved.

Dactylitis may be acute or chronic. In the former the joints are most certain to be invaded secondarily. The chronic is a specific osteomyelitis and periostitis. The bluish discoloration and cylindrical swelling, usually of the entire finger or toe, is characteristic, and suppuration and necrosis sometimes follow. It may be hereditary or acquired, and is a late manifestation of the disease. Osteo-chondritic inflammation and swelling at the epiphyseo-diaphyseal junction, in the form of a ring or globular swelling, in infants and children is always a manifestation of inherited syphilis. It is peculiarly diagnostic. I have known such a case to be ascribed to tuberculosis. It was operated upon, but cured by specific treatment.

Syphilitic periostitis is usually co-existent with ostitis and ordinarily is a late expression of the disease. If associated with gummata and the periosteum is detached, necrosis is likely to occur.

Synovitis occurs in both acute and tertiary syphilis. The acute affection with effusion and swelling and pallor is not usually painful, and is generally limited to one joint. There is no actual lesion of the parts. The chronic form is more painful and severe, and serious lesion of synovium and cartilage more certain, with consequent impairment of motion. Suppuration is also more apt to occur in this form. The knee, ankle and wrist and hip joints are most apt to suffer. The flat bones—tibia, sternum

and cranium—are most certain to be involved. Small, round cell infiltration is common in bone syphilis, filling the Haversian canals, absorbing the trabeculae, and producing the condition known as rarefying osteitis. Reparative efforts follow, and enlargement, or hyperostosis, and condensing osteitis result. There is no tendency to pus formation or to necrosis, but osteophytes and exostoses occur, as in arthritis deformans of the hip joint. When suppuration occurs, it is due to the degeneration or breaking down of gummata.

Gonorrhoea as a causative agent in the acute synovitis of adults, and syphilis in the same relation to epiphysitis, are too frequently overlooked.

Disease of bones and joints in adults, as well as children, is almost uniformly credited to tuberculosis as the etiological factor. Besides other bone lesions, there is good authority for the statement that many of the cases of hip-joint and Pott's disease of children are caused by hereditary syphilis. It is of more than ordinary importance to make a correct differential diagnosis, for in syphilis there is no tendency to pus formation and to necrosis, while such tendency is most common in tuberculosis. Operative interference is seldom required in syphilis; it is demanded with exceeding frequency in tuberculosis. Syphilis is specially and most favorably affected by proper medication, while tuberculosis is little influenced by it. Suppuration is common to all forms of tuberculosis and it is not localized in its action.

Night pains are characteristic of bone syphilis. A careful and thorough examination of the individual and family history will enable the physician and surgeon to form a rational conclusion as to the nature of the disease, aided, if need be, by therapeutic measures which should always favorably affect syphilitic conditions. In obscure or doubtful cases the latter should never be omitted, as a syphilitic vice, whether hereditary or acquired, must unfavorably affect any disordered state of the bones and joints or operation intended for their relief.

The treatment is that which is appropriate to the same stage of the disease when other structures are involved. If suppuration and necrosis should occur the ordinary surgical procedures applicable to such conditions should be employed, aided always by specific medication which is the essential treatment in bone and joint syphilis as in other forms of the disease.

SYPHILIS OF THE LUNGS, HEART AND VESSELS.

BY H. B. WHITNEY, M. D., DENVER, COLO.

Pulmonary syphilis, of an extent sufficient to give use to clinical phenomena, is certainly rare. It may present itself in three forms: First, the so-called white hepatization, a pneumonic process found chiefly, if not wholly, in still-born or very young subjects of hereditary syphilis. Then in older individuals syphilis may produce both chronic fibroid and chronic ulcerative processes, the latter especially resulting from gummatous infiltration and softening. The clinical picture in these cases resembles very closely that of chronic phthisis; there are no clearly instructive or pathognomonic features. It is certainly important to remember the possibility of syphilis in every phthisical, and in certain cases to try an anti-syphilitic treatment. Suggestive features would be a plain specific history, the presence of tertiary lesions in other organs, the absence of tubercle bacilli from the sputum, and possibly the irregular or atypical localization of the physical signs.

The heart also is seldom the seat of syphilitic invasion, and still less frequently in such a way as to be susceptible of clinical diagnosis. It may contain localized areas of interstitial myocarditis, or its wall may be occupied by one of more gummata. Either of these conditions may result in cardiac aneurism and possible rupture; or in a chronic endocarditis which may in some cases affect the valves. It is possible, therefore, for either secondary or tertiary syphilis to give rise to the clinical symptoms of a chronic myocarditis, or to the souffles and other signs of valvular incompetency or stenosis. Here again, as in the lungs, the specific nature of the affection can only be surmised in certain cases where the individual is manifestly syphilitic.

Syphilis of the great vessels is of greater clinical interest because of its probable relation to the most serious form of aneurism. This relation is by no means universally admitted, but since the important investigations of Welch in 1876 it has come to be more and more regarded as an established fact. It

may certainly be accepted as proven that syphilis does cause an endoarteritis, which in the smaller vessels tends to produce such a thickening of the intima as to result sometimes in complete occlusion, sometimes again in yielding and dilatation. This is seen especially in the vessels of the brain, a vascular area for which the specific poison appears to have a remarkable predilection. There is therefore nothing improbable in the supposition that in certain other cases the aorta alone might be the organ selected for attack; here also the poison first affecting the smaller vessels, the vasa vasorum, as demonstrated in certain cases of atheroma by Hyppolyte Martin, and eventually producing an impaired nutrition and even partial necrosis of the corresponding aortic wall. In fifty-six fatal cases of syphilis Welch found that no less than 60 per cent. presented some degree of aortitis. There is, it is true, except in the very rare instances of a genuine gumma, nothing specific in the pathological appearances of a presumably syphilitic aortitis. It seems to differ in no way from the ordinary forms of senile atheroma. And yet there would seem to be some essential difference. Compare the symptoms of simple dilatation of the aorta, so frequently found, even in a partially saccular form, in atheromatous individuals, and those of genuine aneurism. The one is comparatively harmless, the other is unequivocally malignant; it causes local paralysis, it obstructs respiration, it even makes its way through bony structures. Why this difference? Why do we so rarely encounter these virulent forms in aged laborers, in those especially with general arterio-sclerosis and cardiac hypertrophy; in women also, in whom the tendency to simple atheroma appears to be even greater than in men?

To explain these facts on the ground of simple differences in the degree of aortitis in conjunction with higher arterial pressure is unsatisfactory. One would almost affirm a priori that we must be dealing with a different kind of primary aortic lesion, and when we look about for some special etiological factor, some single poison capable of producing such a uniformly serious chain of consequences, it is only in syphilis that we find a wholly adequate cause. Aside from the well known polymorphous character of syphilis and its tendency to produce, especially in later periods, not only specific but also multitudinous vulgar forms of

inflammation, the following arguments speak strongly for the specific origin of most cases of thoracic aneurism:

1. A common history of syphilitic infection. We have all seen isolated instances of this association; I recall two cases of aneurism, both in comparatively young subjects, in whom syphilis was unquestionable. But it is only large statistics, like those of Welch and Hampeln for example, which are convincing. Welch, in 34 cases of aneurism, found undoubted syphilis in 17 and probable syphilis in an additional 8. Hampeln made a careful study of 50 cases which had come under his personal observation. In the 15 male cases which were from private practice, a history of syphilis was obtained in all but one; of 33 hospital cases there was no history at all in 13, and in the remaining 20 a specific history was given in 10. Such statistics can not be explained by the general prevalence of syphilis. Nor is there any other infection or diathesis, like gout, palludism, alcohol, malaria, or the acute infectious diseases, which has any sort of constant relation to the development of true aneurism.

2. Aneurism is a disease largely of late middle life—chiefly in the fifth and sixth decennia. Hampeln's 50 cases occurred: 1 in the third decennium, 6 in the fourth, 22 in the fifth, 15 in the sixth, and 3 in the seventh. This great frequency between forty and fifty might be fairly well explained by a coincidence of beginning atheroma with increased strain. But this does not account for the rarity of aneurism in men over fifty-five, many of whom are still hard workers; while the age of greatest frequency does accord fully with the hypothesis that aneurism is a late tertiary lesion of syphilis. Hampeln even goes so far as to state that if thirty years have elapsed since the date of infection, thoracic aneurism may be excluded in making a differential diagnosis of a mediastinal tumor.

3. Aneurism is known to be relatively frequent among soldiers, who are admittedly prone to venereal infection, and among prostitutes.

4. Iodide of potassium has occasionally effected a remarkable improvement in aneurysmal cases.

Since, however, whatever may be said of the specific nature of the original aortitis, any aneurism, at the time of its discov-

ery, has usually become a largely mechanical lesion, it is evident that in the great majority of cases an anti-syphilitic treatment can accomplish nothing. It is often worthy of trial, chiefly as potassium iodide, occasionally, perhaps, as mercurials. Hampeln thinks that the chief lesson of the specific origin of aneurism should be a still more thorough and prolonged treatment of the primary affection in its early stage.

SYPHILIS OF THE ABDOMINAL VISCERA.

BY HENRY SEWALL, M. D., DENVER, COLO.

Luetic changes in the abdominal organs occur, in the great majority of cases, as late manifestations of the disease; although symptoms involving these viscera, particularly the alimentary canal, may appear among the early or "secondary" phenomena of syphilis. In reviewing my clinical experience, I am convinced that one class of cases above all others has escaped my mental grasp. So often post mortem examination has revealed the scars, adhesions, distortions and parenchymatous changes of organs which must have had their cause in long standing syphilis, but which, during life, failed to give signs of their presence, though the symptoms of morbid change have usually been sufficient to excite correct suspicion. Two reasons are obvious for failure to clinically determine the luetic nature of this visceral disease: 1. Syphilis of the abdominal organs may progress indefinitely without exciting tangible symptoms. 2. The signs and symptoms of visceral syphilis so closely parallel those of non-specific disorders that, unless extraneous considerations make the diagnosis of lues probable, the mind of the observer almost inevitably fastens upon and holds to the non-specific explanation of the clinical conditions. It may well be urged that in the consideration of chronic abdominal disease the suspicion of syphilis as an etiological factor should always be held in

view, and that the diagnosis of this disease should not so generally be limited in its foundation to the mere exclusion of other disorders.

Disorders of the digestive tract, in many cases, owe their origin directly or indirectly to syphilis. Gastric dyspepsia is a common concomitant of the disease. It is a functional disorder and is apparently the result of depraved general nutrition. A very important affection is *chronic gastritis,* which is the chief cause of the poor nutrition of the chronic syphilitic. Its course and symptoms do not distinguish it from the non-specific disorder. This form of gastritis is a feature of late syphilis and is usually accompanied by luetic affections of other abdominal organs, as the spleen, pancreas and liver, and it is perhaps the indirect consequence of disease of these organs. Gastritis may exist alone or be associated with gummata or gummatous ulceration of the gastric mucous membrane. The *round or perforating ulcer* of the stomach is a common lesion in syphilis. According to recent statistics it occurs in nearly 20 per cent. of cases. This is distinct from the gummatous ulcer which may be found independently. The round ulcer probably has its origin in the disturbance of blood flow to the gastric mucous membrane due to syphilitic arteritis. The symptoms, course and termination of the syphilitic gastric ulcer do not distinguish it from the non-specific ulcer, but it is important to notice that in the former, the specific lesion, the accompanying gastralgia is characteristically nocturnal in its periods, while in the simple ulcer the pain has no regular time of onset. One of the most infrequent accompaniments of lues is *gumma* of the stomach. The new growth arises in the submucosa and works its way towards the free surfaces. Its occurrence may be evidenced on the post mortem table by ulceration or by the presence of contracting scar tissue.

Syphilitic disease of the intestines. Except as limited to the rectum, little is known of syphilitic disease of the intestines. There is distinct evidence, however, that acute enteritis involving the duodenum may appear as an early symptom of the disease, simultaneously with the cutaneous eruption. The catarrh may spread to the bile passages and cause jaundice. The affection may pass on to chronic enteritis. It is not to be distinguished from simple enteritis except that it yields only to specific

treatment. The ordinary syphilitic enteritis is chronic and is the result of ulcerative lesions which may be due to the following various conditions: 1. The breaking down of circumscribed gummatous infiltrations of the gut. 2. Ulceration of Peyer's patches and, less frequently, of the solitary follicles. 3. Ulcerations which depend upon the breaking down of tissue involved in waxy degeneration. 4. Extensive diphtheroid ulcerations involving colon and rectum and probably due to a mixed infection (Neumann). In practice by far the most important intestinal lesions of lues are to be found in the rectum. The lesions are, for the most part, the result of direct infection through morbid secretions applied to the anus, and they involve the rest of the rectum by contiguity. They are more common in women than in men, obviously partly on account of anatomical relations. The lesions are usually found near or just above the anal ring. In the early or secondary period of syphilis ulcerations appear associated with papules and infiltration of the anal folds, the infection probably being established through the anal fissures. In the late stage of the disease the ulcerations usually result from the breaking down of gummata in the anal or peri-rectal tissue, or from disintegration of the rectal wall usually with, but sometimes without, antecedent gummatous formation. The ulcerative process may spread through the rectum and reach into the colon. An important sequel, or rather accompaniment, of ulceration is the stimulus given to the formation of fibrous tissue in the affected areas, the contraction of which distorts or constricts the rectum and thereby produces some of the most important clinical features of the disease. An unsavory adjunct of syphilis in this region is the rectal catarrh resulting in a foul, more or less abundant, purulent discharge which arises from the diseased surfaces. Finally, one of the most frequent and hopeless conditions found in late lues is *amyloid or waxy degeneration of the intestine*, recognized post mortem by the stiffness, paleness and waxy lustre of the intestinal mucosa. It is usually associated with similar degeneration of spleen, liver and kidneys. The clinical history is marked by indigestion, uncontrollable diarrhoea, dropsy, etc.

Syphilis of the pancreas may be dismissed with a word, not only because acquired disease of this organ is one of the rarest

phenomena, but because there are no certain clinical signs of its existence. Pancreatic lues is of frequent occurrence in the inherited disease.

Syphilis of the spleen is usually attended with evidence of the disease in other abdominal organs. It has recently been demonstrated that *acute splenitis* may occur among the early constitutional symptoms of the disorder, and subsides under the influence of specific treatment. Syphilitic *interstitial splenitis* is seldom found except as associated with syphilis of other viscera. The organ is slightly enlarged, unusually firm and its surface is irregular from contracting scar tissue. Unless attended by peri-splenitis the condition can hardly be recognized during life. *Parenchymatous inflammation of the spleen*, and the development of *gummata* in the organ, are rare events. Finally, *amyloid degeneration* of the spleen is not an uncommon effect of late syphilis, occurring more often than the similar change in the liver. It is usually combined with a like degeneration of other abdominal organs, and this association is important in diagnosis. The amyloid spleen is increased in size and in resistance to the touch. Profound disturbance of digestion, colliquative diarrhoea, etc., attend it and its associated conditions.

Syphilis of the liver is perhaps more apt to be recognized clinically than similar disorder of any other abdominal viscus. In early lues, coincident with the eruption, a jaundice of doubtful pathology is apt to appear, fading as the skin becomes clear. There are two syphilitic inflammations of the liver: 1, *interstitial hepatitis;* 2, *gummatous hepatitis.* They are usually accompanied by peri-hepatitis and they may be combined either with the fatty or the amyloid degeneration. There is substantial reason for supposing that syphilitic inflammation of the hepatic parenchyma stands in causal relation to acute yellow atrophy of the liver. In the *interstitial* form of hepatitis the liver is reduced in size, the surface is rough and is marked by various prominences separated by deep clefts. There are usually adhesions to adjacent organs. The condition is commonly described as one of the tertiary manifestations of lues, though some authors consider it part of the secondary stage. I have seen this form of hepatitis well marked in an autopsy on a negro boy about sixteen years old. Adhesions of the liver to the dia-

phragm and adjacent organs are among the most common finds of our autopsies, and they represent peri-hepatitis of more or less remote occurrence. Evidence of this condition may be gained during life by observing the lessened mobility of the liver as witnessed by the small excursion made by the upper line of liver dullness with deep respiration. The welding of the liver to the diaphragm probably prevents normal contraction of the muscle fibres so restrained. The contraction of the excessive amount of connective tissue in interstitial hepatitis causes atrophy of the liver cells, with gradual loss of hepatic function. Ascites usually, though not always, results from interference with the portal circulation, and hemorrhages from the oesophagus, stomach and intestines may occur from bursting of the swollen varicose veins of these parts. When the disease has not progressed too far anti-syphilitic treatment may effect a cure. My records show marked improvement following the exhibition of potassium iodide in cases giving satisfactory clinical evidence of syphilitic interstitial hepatitis. This form of syphilitic hepatitis is particularly apt to occur among spirit drinkers, but *gummatous* hepatitis is otherwise said to be the more frequent form of the disease. In *gummatous hepatitis* the perihepatic inflammation is a nearly constant accompaniment. The surface of the organ is more or less puckered by sheafs of connective tissue which cause its mass to bulge in projecting knobs. The gummata vary in size from a pin's head to a walnut. They form rounded masses of central caseous material inclosed in a fibrous capsule. They are found both subserous and in the depths of the organ, and are not sharply defined from the parenchyma. This form of hepatitis may progress without producing clinical symptoms. The size of the liver is usually normal or diminished. The surest clinical sign of the condition is the recognition of deep clefts in the edge of the liver and of prominence on its surface. Ascites in the uncomplicated condition is rare. Functional disturbances of the digestive tract are constant phenomena. Gummatous hepatitis is a disorder of tertiary syphilis.

The amyloid or waxy liver is found in constitutional syphilis oftener than in any other disease except tuberculosis. In the pure form of the disease the organ is commonly enlarged in all dimensions, though not to the enormous extent found in waxy

livers due to other causes. The density of the liver is increased, its surface is smooth and on section the substance is pale grey-yellow or grey-brown and shows the characteristic reaction with iodine. Waxy degeneration is usually the sequel of prolonged syphilitic suppuration of bone or of extensive lesions of the skin and mucous membranes. The condition is usually combined with amyloid degeneration of spleen and kidneys. The diagnosis is often extremely difficult on account of the lack of positive clinical signs and symptoms of the disorder. Some aid may be gained from the increase in the size of the spleen, which is also in an amyloid condition, and the history of the case is indispensable in directing the examination.

Syphilis of the kidneys is, as might be supposed, a very common event, though it is doubtful whether the specific etiology of pathologic urine is often borne in mind. Still less often, probably, is anti-syphilitic treatment applied to such disorders by reason of the traditional belief in the irritant action of mercury and potassium iodide on the kidneys. *Albuminuria* occurs in all stages of syphilis. When renal lesions are not present the disturbance is probably produced by the syphilitic toxines circulating in the blood. *Paroxysmal haemoglobinuria* is relatively frequent in syphilis and is not clinically different from the non-specific form except in its amenibility to anti-syphilitic treatment. *Syphilitic nephritis* may represent most forms of kidney disease. It may occur as: 1, parenchymatous, acute or chronic; 2, interstitial; 3, gummatous nephritis. These forms may be combined together or with, 4, amyloid or fatty degeneration of the kidney (Neumann). The parenchymatous disease can occur in any period of lues, but is especially found in its early stages. The suspicion that the renal lesions of syphilis are the result of specific treatment does not appear to be well founded; on the contrary, severe cases of luetic nephritis have been found to improve on such treatment. *Syphilitic interstitial* nephritis is a late manifestation of the disease. Its onset is so gradual that it escapes attention much longer than the similar disorder of non-specific origin. Post mortem the two kidneys are apt to be found very unequally affected.

It is impossible to discuss here the origin of the renal changes of syphilis—whether they are directly due to the action

of the specific poison upon the secretory protoplasm or indirectly through disease of the vascular walls or of the interstitial tissue. The other kidney diseases of syphilis will be dismissed with a word except as to the relative frequency of their occurrence. Spiess, in autopsies upon 220 syphilitics, found that 147 or 66.8 per cent. showed lesions of the kidneys. Among these were 42 cases of amyloid kidney and 7 of gummata of the kidney. It should be said that uncomplicated waxy kidney, as it occurs in other diseases, is a rare event in syphilis.

INHERITED SYPHILIS.

BY SOL G. KAHN, M. D., LEADVILLE, COLO.

Inherited syphilis is not the most satisfactory subject to write upon, for the reason that opinions are so much at variance as to whether the ovule receives its virus from the mother exclusively, or whether the father alone can be responsible for the infection without first transmitting the disease to the mother and the ovum receiving its infection from the maternal side only.

Angier Ferrier in 1553 stated that hereditary syphilis had three possible sources of origin: (1) The semen of a syphilitic father; (2) the impregnated ovule of a syphilitic mother; and (3) infection of the foetus by the blood of the mother who had acquired syphilis after conception. Hunter denied the hereditary transmissibility of syphilis from a father. Swediaur, in the beginning of the nineteenth century, contended that syphilis may be inherited, and that in almost every case of the kind the disease is transmitted from the father and not from the mother. Cullerier and others, on the contrary, asserted that syphilis is transmitted to the foetus through the mother alone. After four and one-half centuries of discussion, scientific research, and clinical experience, the consensus of opinion to-day, as near as I can ascertain, is that Ferrier's views published in 1553 were correct;

that syphilis in the child may be derived from either parent; that the general result is the same, whether the father or the mother is affected; also that infection of the child can take place, during foetal life, if the mother acquire syphilis before the seventh or eighth month of utero-gestation. The shorter the interval between the infection of one or both parents and impregnation, the greater the liability of the foetus to become affected. Maternal infection is more potent in its influence for harm than is that from the father, since the blighting effect of an ovarian infection is reinforced by the devitalizing influences of a maternal dyscrasia.

Fournier's tabulation, based on 500 observations, expresses the relative gravity of the three forms of descent. Among the cases of paternal heredity, 28 per cent. died and 37 per cent. showed lesions of syphilis. Among the cases of maternal heredity 60 per cent. died and 84 per cent. showed lesions of syphilis. Mixed heredity caused deaths in 68½ per cent. and lesions in 92 per cent. These estimates demonstrate that paternal heredity, though more frequent than the other forms, is less than half as communicable or fatal as is maternal heredity, and that the latter is less virulent in its effects than mixed heredity. It has been proven that active specific treatment during pregnancy greatly reduces the mortality of the children, and many of them are free from any manifestation of the disease.

It may probably be accepted as a fact that if syphilitic manifestations occur during intra-uterine life or immediately after birth, the malady is likely to prove very severe. The number of infants affected at these periods that survive is not large. The older the child at the date of the first symptoms, the more likely it is that it will bear the disease and prosper under the treatment.

Children of syphilitic parents often show no signs of the inherited disease at birth; its presence, however, is sooner or later manifested by unmistakable symptoms. The interval is sometimes considerable, and this characteristic latency constitutes one of the differences which exist between the acquired and the hereditary forms of the disease. It may be laid down as a general rule that the period at which hereditary symptoms manifest themselves depends upon the condition of the disease

in the parents. The more recent the infection and the more marked the evidence thereof, the earlier and the more decided will be the manifestations in the progeny. Of the children who survive, many reach a condition of apparent health, though many bear through life the marks of their inheritance.

Abortions, miscarriages, death of the foetus, a child born with marked symptoms, another with mild symptoms, are, so to speak, measures of the intensity of the parent's disease. If the disease in the father or mother be almost extinct at the time of impregnation, the child, when born, may be to all appearances perfectly healthy, and may either remain so or else develop symptoms of syphilis some months or years afterwards. In a large majority of cases the symptoms of hereditary syphilis appear either at birth or some time during the first three months. It is only in exceptional cases that the outbreak of the symptoms is deferred until the fifth or sixth month. When the manifestations of syphilis are delayed beyond the third month, it may generally be anticipated that the complaint will assume a comparatively mild form and will yield readily to treatment. The aptitude to transmit the disease decreases spontaneously, in many cases, with the lapse of time. The influence of mercurial treatment of the parents upon the health of the offspring is much more certain than that of time alone. A pregnant woman who is syphilitic, whether her syphilis was acquired before or after conception, should be thoroughly treated to avoid disaster to the child.

Colles' law, which states that a child begotten by a syphilitic father and born of an apparently healthy mother cannot infect her, even though it exhibit venereal ulcers on the lips and tongue and in suckling cause cracks and fissures in the mother's nipple, was formerly regarded as a positive proof that the mother of a syphilitic child was always herself syphilitic, since only in this way could her immunity be explained. Diday applies to the explanation of this well-known phenomenon Pasteur's discovery that methodical repetition of inoculation alternates and ultimately neutralizes the virus of disease. This is shown when animals are repeatedly inoculated with the virus of hydrophobia. When a woman bears a syphilitic child the blood freely circulating between mother and foetus becomes a vehicle for repeated

inoculation of the alternating fluid, and the mother is rendered proof against syphilis by seven or eight months of perfected Pasteurization.

We are well aware that the opinion prevails that after three years of active treatment a patient suffering from syphilis is considered cured; but according to statistics cases of hereditary syphilis have been observed which were transmitted more than six years after primary infection; also apparently carefully observed cases are recorded pointing to heredity from parents in the fifteenth and even in the twentieth year.

Hereditary syphilis differs from the acquired disease in being constitutional from the first. There is no primary stage, that is, there is no chancre, nor in the course of its development can the manifestations of the disease be classed under periods.

When a child the subject of hereditary syphilis is born alive, the appearances vary in different cases. In a large proportion of instances the child appears healthy and vigorous; in another class the children are puny and delicate, but no decided symptoms appear until several days or weeks have elapsed; while in a third and less numerous class the children are born with marked evidences of the disease. The most prominent symptoms in hereditary syphilis are the affections of the skin and mucous membrane. Before any eruption appears, there are, in many cases, certain peculiar symptoms by which the hereditary taint may be recognized.

The typically syphilitic child is at birth a wasted, wizened, snuffling, feeble creature, with a weak, hoarse cry. The face looks wasted, the integument is thrown into folds, giving the child the appearance of old age. The nostrils, lips and angles of the mouth are scored by fissures, and the submaxillary glands are hard and swollen. The skin generally is either dry or has a shining waxy appearance; the smoky or sooty tint is well marked. The most prominent of the skin affections are the vesicles or bullae, which are most frequently found on the soles of the feet, palms of the hands, and nates. The most frequent affection of the mucous membrane is the nasal catarrh, which attacks a very large proportion of syphilitic infants. It appears early, often, if not always, preceding the eruption. The mucous membrane of the nose becomes swollen and partially closes the

nasal passages. A nasal discharge appears, gradually increasing and causing the symptom known as snuffles. There is no organ or part of the body of a child born tainted with syphilis that may not be affected to a greater or lesser extent—from the bones, muscles, arteries and veins, to the brain, nerves, and nerve-endings, not overlooking the nails, hair and teeth. Careful attention has been given to the teeth. The crescentic notch, or what is known as the Hutchinson tooth, is of great diagnostic value, being discolored to an ashy grey; the enamel is imperfect, the incisors are pointed and narrow at their edges, and furrowed with a crescentic notch which, once seen, cannot easily be mistaken for any other condition.

The treatment of inherited syphilis may be considered under three different heads: First, the prophylactic treatment of the parents before conception. Second, the treatment of the mother during pregnancy. Third, the treatment directed to the child. This may be carried on in three different forms: (1) By mercurializing the mother, and in this manner having the child's food medicated; (2) by inunction; (3) by direct medication per mouth. Hydrargyrum cum creta is the preferred preparation for these infants; it is usually administered in one-half grain doses twice daily, but may be gradually increased.

"IS SYPHILIS EVER ACTUALLY CURED?"

BY F. FINNEY, M. D., LA JUNTA, COLO.

The best authorities, I believe, agree that syphilis is caused by a living organism. They also agree that we have not yet discovered what this organism is. This contagium at the point of infection gains entrance to the circulation through the lymph channels, and the whole human organism is infected. It is true the contagium usually loses its destructive qualities in time, either with or without treatment, and it will then fail to propa-

gate the disease in healthy persons. It does not necessarily follow that the individual having the disease is cured.

Lang says in this connection: "The supposition that the danger of infection ceases after syphilis has lasted for two, three, or four years is based upon very insecure premises. But even if the poison loses its power of infection, it may remain latent until by some often external cause it is stimulated to new growth, and produces in a definite part a very characteristic reaction which represents the late form of syphilis. The semicircular and circular forms of the later syphilitic manifestations justify the conclusion that the power of propagation by the micro-organism is still preserved. It is probable that the virus retained in the lymphatic glands, and in other tissues, may remain inactive for a considerable time, and then be gradually destroyed; but, if it reaches the circulation through the vasa deferentia, which it may do after years, then relapses occur in remote tissues."

It appears, then, from our present knowledge of the pathology of this disease, that we have not yet arrived at a point where we can apply a treatment which is curative. I can readily believe that the time will soon come when the disease will be so thoroughly understood that we will have the means at hand for its cure, as we now have most notably in diphtheria.

I can do no better, in closing the negative side of this question, than to quote again from Lang on treatment of syphilis: "It must be honestly admitted that while we can, probably in the great majority of cases, not only cause the disappearance of the symptoms, but also prevent the transmission of the disease by heredity, yet up to the present time we *do not* possess any mode of treatment by which we can *positively* cure this dangerous disease, radically, and thus absolutely protect the patient against relapses."

PROPHYLAXIS OF SYPHILIS.

BY E. STUVER, M. D., FORT COLLINS, COLO.

The old adage, "An ounce of prevention is worth a pound of cure," nowhere applies with greater force than in connection with the dread disease, syphilis.

The question as to the best means of limiting its communication and prevalence has received the earnest attention of physicians, sanitarians and philanthropists, and many fierce polemical battles have been fought, and are still being waged, over this subject. At one time it was thought that a strict licensing and medical inspection of prostitutes would solve the problem, but the experience of Berlin, where medical inspection was carefully and vigorously carried out, has proven this to be a false hope, and we are brought face to face with the fact that other and different measures must be adopted if we would stay the ravages of this fell disease.

Legal restriction and medical examination not only fail to prevent the spread of the disease by those subjected to their restraints, but such measures enormously increase the number of clandestine prostitutes or "soft snaps" as the latter are sometimes more euphoniously designated by their admirers or apologists. I believe the experience of physicians who have given the matter careful attention will corroborate the statement that these clandestine prostitutes are more liable to convey the disease than those who ply their vocation openly. Business reasons and a desire to secure trade compel public prostitutes to keep clean, while the lack of these incentives leads to a very different condition in the other class, of which fact I have often had very emphatic evidence furnished by their victims.

But the question very naturally arises, What shall be done? The state isolates and quarantines persons suffering from scarlet fever, diphtheria and other contagious diseases; it erects smallpox hospitals and confines those affected with this easily preventable and comparatively harmless disease within their walls. Why, then, should it not likewise throw its protecting aegis over

the community and also confine within special hospitals all persons with syphilis during the contagious stage of the disease, or until discharged by competent medical authority? This, in connection with county registration of syphilitics would, I believe, do much toward holding the disease in check. But the only measure which, in my opinion, will ever produce a decided restriction in its prevalence, is a more careful education of the people as to the dangers of the disease and the best means of avoiding it.

In the first place, a higher moral tone should be inculcated and a single standard of morals for both sexes should be insisted upon. Whenever society can be brought to adopt this view, and men can be made to feel that the disease leaves the same stigma of shame and disgrace upon them that it inflicts upon their wives and daughters, when contracted in the same way, we shall possess a strong inhibitive influence in checking the disease. When a clear and imperative demand shall be made by the moral sense of our people that young men shall rule their passions rather than be worse than bestialized by an unbridled indulgence of them; when the great educators, teachers, parents, and physicians shall be impressed with the importance of imparting a clear knowledge of the physiology and proper use of the sexual functions, and the ravages caused by venereal diseases, we shall be spared the disgusting spectacle of persons in the active contagious stage of the disease mixing freely in society, and of men in high places pooh-poohing or apologizing for youthful vices.

In closing I desire to reiterate the conclusions drawn from a most excellent paper by Dr. Fred C. Valentine.[1]

1. Sufficient of the physiology and pathology of the genito-urinary apparatus should be taught in institutions for higher education to convey to students the dangers of genito-urinary diseases to themselves and others.

2. Similar instruction should be given in schools attended by boys at the age of puberty.

3. No man who has ever had gonorrhoea should be allowed to marry until it is proved by a physician that he cannot infect his wife.

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[1]Journal A. M. A., Mar. 3, 1900, p. 532.

4. Regular physicians should be elected by their societies to deliver evening lectures to the public on genito-urinary diseases.

5. Every father should be taught to warn his sons of the dangers of genito-urinary diseases. When, from incompetency or delicacy, the father cannot or does not wish to do this, the family physician should discharge that duty.

6. Every medical society should elect its most competent member to write at least one article on the subject, worded for laymen's comprehension, and to be published under the auspices of the society.

SYPHILIS AND TRAUMA.

BY LEONARD FREEMAN, M. D., DENVER, COLO.

The relation of traumatism to syphilis is a subject about which comparatively little is known. It was formerly believed that the connection was intimate—that injuries to syphilitic individuals and operations upon them were often followed by more or less serious complications—but this extreme view has undergone considerable modification. We now believe that many unfortunate results have been due to mixed infection and ordinary sepsis; the embryonic tissue of gummata, like that of post typhoidal granulomata and tubercular deposits, being very susceptible to the action of pus-forming micro-organisms. There is little question that under favorable circumstances most injuries heal as rapidly and as thoroughly in syphilitic patients as in others, providing no pre-existing specific deposit be directly involved.

Primary Syphilis—There are those who claim that the virus of syphilis may infect the uninjured mucous membrane, but in the vast majority of instances, if not in all, a preliminary lesion is necessary, and with the skin there are certainly no exceptions to the rule.

It is a matter of common experience that primary sores respond unfavorably to irritation arising from cauterization or

other causes, and that a mixed infection may thus be inaugurated, resulting in a suppurating bubo.

Secondary syphilis is less closely related to traumatism than either the primary or tertiary forms. It is true, however, that eruptions of various kinds can be increased in severity or even precipitated by irritations of the skin, such as excessive perspiration, uncleanliness, the rubbing of tight clothing, etc. This helps to explain the appearance of condylomata about the anus and genito-femoral folds, and the intensity of eruptions beneath the straps worn by soldiers across their bodies. We are all familiar with the bad effects of tobacco upon mucous patches within the mouth.

There is also reason to believe that secondary specific rheumatisms and neuralgias may be increased or produced by local injuries, although this is not usually the case.

Whether syphilitic iritis is ever directly due to traumatism is questionable, but there is no doubt that its severity can be thus increased—for instance, by excessive use of the diseased eye.

The healing of ordinary wounds and injuries is little if at all retarded. It has often been asserted, however, that failure is apt to result in skin-grafting and plastic surgery. If this be true, it is, perhaps, due to points of specific infection existing within the skin, which may remain long after the visible eruption has disappeared.

Tertiary Syphilis—In tertiary syphilis the effects of traumatism are quite noticeable, although they have been grossly exaggerated.

The localization of gummata of the osseous system may be determined by injury, although in an effort to assign a cause for a lesion a patient will remember those trivial injuries which are always occurring to everyone, and which may have no bearing upon the existing conditions. Innumerable traumatisms are constantly being inflicted upon the bones of syphilitics without the production of gummata, which fact might be explained by assuming that a latent specific deposit must first be present.

Too much stress has been laid upon the effect of syphilis in the union of fractures. In fact, there is really no proof that union is at all retarded, unless it be through a general marasmus

which at times exists to a marked degree. Usually fractures unite almost, if not quite, as readily in syphilitics as in others.

Fractures, however, are sometimes directly produced by gummata. I have personally encountered such a condition in the tibia in which I found it expedient to resort to amputation. Some writers have also affirmed that the skeleton in syphilis might be so weakened by deprivation of lime-salts that the bones could break under slight provocation.

These pathological fractures occur in the long bones only, and are at times multiple, cases having been reported in which both thigh bones or both upper arm bones have been broken in the same individual.

It is common knowledge that it is dangerous to interfere with gummata in any situation, unless they are completely excised, and especially is this true of osseous lesions; but after the active specific process has subsided, its effects in the shape of dead bone, cicatrices, etc., may be removed with safety.

Little is known with certainty regarding the part played by traumatism in syphilis of the nervous system. It may be true that an injury can determine the formation of a gumma of the brain or cord, but no proof of this has ever been produced. The same statement may be made in reference to specific manifestations in any of the internal organs. To be sure, positive statements are often made in this connection, but they are apt to be mere traditions handed down from one writer to another.

Whether we regard traumatism as a major or minor factor in specific manifestations, the fact remains that it is the slight injuries, those in the nature of comparatively trivial bruises, that are the most productive of results. The reparative processes following severe lesions are, perhaps, too active to permit the growth of syphilitic germs, this being analogous to what has been demonstrated by experiment in connection with tuberculosis and osteo-myelitis.

SYPHILIS IN ARMIES.

BY LIEUTENANT-COLONEL HENRY LIPPINCOTT, MEDICAL DEPARTMENT, U. S. A.

Syphilis in armies, as we all know, does not differ from the disease as manifested in civil life, though no doubt conditions occasionally arise whereby the disorder, as it affects the soldier, is intensified.

The great attention that is now paid to hygiene in all important armies serves to eliminate or to diminish factors that formerly were conducive not only to the spread of syphilis, but of other infectious diseases as well. As Armstrong says, "A study of syphilis in relation to public health entails a consideration of the danger of syphilis in regard to the individual," and surgeons, civil and military the world over, recognizing this fact, have done much to prevent the infected from infecting others. Medical men have called the law-maker to their aid, and England's contagious diseases acts have demonstrated beyond question the good that may be done for the soldier and civilian alike under the guidance of our profession. In this connection and for an interesting summary of this work, your attention is invited to the London Lancet for August 12, 1899. In the United States army we have not had the support of the civil law as have the military and naval authorities in the British empire, but our commanders and surgeons have done their utmost to prevent a large sick list from the disease we are considering, and this not without material success.

In the United States army (volunteer and regular) our methods are chiefly advisory, and not infrequently we see excellent results from our endeavors. In this regard I would ask your attention to a circular that was issued to the troops of the eighth army corps on this subject in August, 1898. It is an earnest of the beneficial results we expected from wholesome advice, and reads as follows:

Headquarters Eighth Army Corps,
Manila, P. I., August 27, 1898.

Circular No. 3.

The following is a copy of a communication received at these headquarters and is published for the information of and as a warning to the troops. Commanding officers of regiments and separate military organizations and detachments will communicate the contents of the same to the enlisted men under their supervision and control.

By command of Major General Otis:

(Signed) THOMAS BARRY,
Assistant Adjutant General.

"Headquarters Department of Pacific and Eighth Army Corps,
"Chief Surgeon's Office, on Board Steamer Newport,
"Manila Bay, July 27, 1898.

"The Adjutant General, Headquarters Department of Pacific and Eighth Army Corps, on Board U. S. Steamer Newport:

"Sir—It becomes my duty to invite attention to the great danger of syphilitic infection in the men of this command. It is believed that syphilis in a most virulent and serious type exists in these islands, and that our men are very liable to be infected unless stringent measures are adopted by the commanding officers to prevent the men visiting houses of ill-fame or associating with lewd women. It may be necessary to adopt a system of examination when Manila falls, but in the meantime I do not think it advisable to recommend such action. This communication is intended to suggest the terrible consequences that may result in the United States by the arrival there of men poisoned by Asiatic syphilis, not to mention the loss of time consequent upon the disability the men may incur. Very respectfully,

"(Signed) HENRY LIPPINCOTT,
"Lt. Col. and Deputy Surgeon General, U. S. A.,
"Chief Surgeon."

In our home stations the unfortunate soldier is segregated, for in all well-regulated hospitals of the United States army a room is set apart for venereal cases, and so long as the patient remains in hospital the rules are absolute in regard to the possi-

bility of infection. The Lock hospital system has in a measure, therefore, its counterpart in our service. We take the greatest care that the patchy mouth shall not give out its poison to others through means of pipes, drinking cups, etc., and we see to it that the soldier who has a primary sore is not permitted to depart from the quarters assigned to him. All such cases are carefully watched and treated until danger of infection appears to be over. Yet notwithstanding all that is or has been done to prevent syphilis in armies, the disease always exists in greater or less degree and is the cause of the loss of much time to the governments concerned.

It is impossible with the data at hand to arrive at a full statistical record of the disease in the various, or even in the more important, armies at present, but in so far as relates to our own military establishment, I am able to state that for the fiscal year ended June 30, 1898, the admissions on account of venereal diseases were equivalent to 84.59 cases in every thousand of the strength present, as compared with 78.08 in 1896, and with 76.32 the average of the preceding decade. For the same fiscal year (i. e., 1898), the United States army admission rate for *syphilis* was 12.04 per thousand, with 1.20 constantly on sick report—and for the calendar year 1898 the admission rate was 10.08 per thousand. The average duration of cases for the fiscal year ended June 30, 1898, was 36.46 days. For the decade 1886-1895 there were 17.45 cases of syphilis admitted for every thousand of mean strength of white troops; and there were constantly non-effective on account of the same disease 1.68 per thousand. For the same decade there were 20.98 cases of syphilis for each thousand of colored troops, with 2.02 constantly non-effective. Constantly non-effective from syphilis for same period 1.94 per thousand of mean strength; this embraces white and colored.

For the year 1896 there were 11.56 cases of syphilis taken on sick report for every thousand of mean strength of white troops, and constantly non-effective from same disease 1.28; for same year there were 4.75 cases of syphilis for each thousand of colored troops, with .38 constantly non-effective.

For the year 1897 we had 11.01 cases for each thousand of mean strength of white troops, with 1.13 constantly non-effective,

while for the same year the colored troops had 23.11 per thousand, with 1.19 constantly on the sick list.

During the calendar year 1898, 71,250 men were examined for the regular army of the United States. Of these 66,237 were white and 5,013 colored. Total number (white and colored) accepted was 54,896. Of every thousand examined 9.71 were rejected on account of venereal diseases. I am not able to give reliable data in regard to the volunteers for the reason that the reports are not available.

Armstrong's tables show that in the army of Great Britain syphilis caused per thousand of strength, in

1887: 116.39 admissions; 0.03 deaths; 0.64 discharges;
1888: 106.52 admissions; 0.11 deaths; 0.93 discharges;
1889: 92.89 admissions; 0.03 deaths; 1.05 discharges.

In the army of Italy it caused in

1887: 5.68 admissions; 0.01 deaths; 0.01 discharges;
1889: 8.62 admissions; 0.01 deaths; 0.02 discharges.

In the army of Prussia, Saxony, and Wurtemberg it caused in

1886-'87: 8.74 admissions; 0.01 deaths; 0.03 discharges,
1887-'88: 6.30 admissions; 0.0 deaths; 0.04 discharges;
1888-'89: 11.11 admissions; 0.01 deaths; 0.01 discharges.

He says that although these tables are meager they are sufficient to show the difference in frequency of the disease in various countries, and from the same author I gather that the percentage of syphilis in the Austrian army averages about 9.68. The writer referred to states that the number of cases of syphilis that appeared in a thousand healthy men in a year was in the

English army (average three years).....105.3
European army in India (average ten years)..... 67.5
United States army (average ten years, 1881-'90)..... 11.5
Prussia, Saxony, and Wurtemberg army (average three years) 8.9
Native army in India (average ten years)..... 8.3
Italian army (average two years)..... 7.2

He further states: "Figures that show that from 7.2 men in Italy to 105.3 men in Great Britain and its colonies, in every

thousand, suffer from syphilis have a range of variation that is too wide for general statistical value, though undoubtedly they indicate the prevalence of the disease in the respective countries."

These figures are interesting, but I must refer you to the author should additional data be desired.

TREATMENT OF SYPHILIS.

BY WILLIAM P. MUNN, M. D., DENVER.

The modern treatment of syphilis must take account both of the patient and the disease. We base our therapeutic measures upon certain definite ideas of the pathology of the disease process combined with a definite estimate of the personal idiosyncrasy of the patient to the drugs or other remedies that it is found necessary to apply.

When a patient presents himself with a recently manifest initial lesion, there are some circumstances that justify resort to surgical measures in the attempt to abort the disease. Such efforts are not as a rule successful; indeed there are not wanting authorities who deny the credibility of all reported cases of aborted syphilis by excision of the initial lesion. Nevertheless in a small proportion of instances capable observers have excised what has seemed to be a typical initial lesion and there has been no development of constitutional symptoms. An indurated chancre that has not been present more than twenty-four hours upon a long prepuce is probably the best situated for complete and free removal, circumcision being the preferable operation. In one such instance a sore that seemed typical, and which Dr. Axtell pronounced to have all the microscopic characteristics of a true chancre, was removed by me five years ago and the patient has remained free from even the slightest suspicion of constitutional symptoms. Such a result is exceptional but must be the justification for repeated attempts at abortive measures.

The usual treatment for an ordinary initial lesion when on the genitals is cleanliness attained through the use of antiseptic powders, of which I find europhen or acetanilid the best. Iodoform is of course somewhat efficacious, but should not be used on account of its odor. A true, uncomplicated chancre rarely needs escharotic treatment. When its size, neglected condition, or complication by gonorrhoeal or chancroidal infection seems to demand the use of an escharotic, the galvano-cautery is, in recent years, the most generally used measure. The use of nitric and carbolic acids has been largely discontinued because they are likely to flow over contiguous mucous membrane and thus cause an enlargement of the ulcerated surface. The strong 40 per cent. solution of formaldehyde is the liquid application par excellence if the surgeon desires to use any liquid application. After the use of any escharotic it is necessary to apply dressings from day to day. In such instances the raw surface is best cleansed with dioxid of hydrogen, then thoroughly dried and a dressing of aristol, europhen or acetanilid applied to the ulcer only with a pledget of cotton or gauze, and the surrounding healthy mucous membrane protected, either by a simple dusting powder, such as stearate of zinc, or a light application of vaseline. The dry dressing is in every instance the preferable one.

When the initial lesion is extra genital, and especially when it is in the mouth, the difficulties of treatment are often increased. In such cases the patient will often refuse to concur in the diagnosis, and can not be made to realize the necessity for proper treatment and continuous observation. On the lip the dry method of treatment can be followed with a fair degree of success. On the tongue or in the throat, treatment becomes somewhat difficult but is all the more urgent. Nitrate of silver in strong solution is the best local application for a chancre on the tongue. A 40 to 60 grain solution should be applied every second or third day if necessary. Precocious ulcerating gummata in the buccal and fancial mucous membranes, which are very apt to occur in connection with such an initial lesion, as well as occasionally in the progress of ordinary fulminant cases, need to be watched for carefully and energetically treated both by local applications and by early resort to internal medication.

The inguinal lymphatic enlargements in association with the genital initial lesion rarely need special treatment, but when the

enlargement is excessive or painful it may be necessary to resort to the early use of mercurial inunctions. Since inunction partakes of the nature of constitutional treatment it should not as a rule be employed until there have been other manifestations of the disease than the initial sore. I heartily agree with the advice of the majority of writers that constitutional treatment should be if possible deferred until secondary manifestations are apparent. This delay is justified (1) because it renders the liability of error in diagnosis less; (2) because the regularity of development of the disease is not interfered with; (3) because the patient himself is then more firmly convinced of the nature of his trouble and the necessity for continuous surveillance thereafter; and (4) because, as a rule, constitutional treatment is not curative in effect before the disease itself has become constitutional, but simply renders the first eruptions less characteristic and thus tends to confuse both physician and patient.

The constitutional treatment of syphilis is not the simple routine that some apprehend it to be. We have of course the specific medication with mercury and iodid of potassium. These remedies are the specific antidotes of the syphilitic poison. Then we have the tonic treatment of the digestive tract, to enable it to withstand not only the disease process but the local disturbances that are so apt to follow ingestion of the specific medications. Third, comes the treatment of the degenerative blood changes that are the inevitable accompaniment of syphilis. Fourth, and last, the eliminative treatment that not only aids the specific medication but prevents depression by the medicaments themselves and enables the system to bear a larger and more continuous dosage of the specifics.

The time to begin the administration of mercury, the form in which to give it, the dosage for the particular case and the length of time it may be continued, are sufficient factors alone to make a very pretty problem in therapeutics out of every case of syphilis that presents for treatment. It is rarely justifiable to administer mercury until secondary symptoms have become manifest. Exceptions to this rule are the fulminant cases of infection, when acute febrile disturbance succeeds the initial lesion before the rashes appear; when lymphatic involvement appears early and becomes excessive; and especially when the lesion is

in the mouth and the glands of the neck become seriously involved at an early stage. These instances do not admit of delay. Fortunately the acute conditions will usually be sufficient to convince the patient absolutely of the nature of his case without waiting longer for the appearance of the rash. But in practically all other cases, except in pregnant women, it is better to await the appearance of the macular eruption.

The methods of administering mercury are many and varied. American practitioners in general practice prefer to give the remedy by the mouth or by inunction. In the former case the bichlorid, the biniodid or protiodid are preferred, although many older practitioners still like to use hydrarg cum creta. At first the mercury should be given alone and it should be pushed to the verge of tolerance; this will be, for most persons, of the protiodid something less than two grains daily in divided doses; of the biniodid a daily total of not more than two-thirds of a grain; of the hydrarg cum creta a daily total of about ten grains. These totals must be reached by a gradually increasing dosage and the condition of the gums and the bowels carefully watched from day to day. In this connection it seems well to direct attention to the cast-iron insolubility of some of the ready-made pills of these medicaments. For prompt therapeutic effect it is necessary that the mercurial be absorbed after ingestion. After the patient has taken mercury about ten days it is time to begin the administration of iodids. The initial dosage need not exceed ten grains three times daily; if the eruptive manifestations begin to disappear promptly with this dosage it need not be increased. If, however, after three days there is no modification of eruption, or if it continues to increase and mucous patches begin to develop, the iodid dose should be rapidly increased at the rate of five grains per dose each day until the disease manifestations begin to abate. There are not many cases that require over ninety grains per day; but there are some that demand very greatly superior dosage; this is found to be true in old and neglected cases, especially when ulcerative changes of the skin and gummatous deposits in the nerve centers have to be dealt with. The maximum dosage of iodid of potassium that I have employed was 960 grains daily for a period of over a month. Other reporters have often exceeded this dosage in des-

perate cases. The index of a sufficient dose is the beginning of clinical improvement, and so long as improvement continues and nutrition improves the maximum dosage need not be modified until the active clinical signs have disappeared.

Very mild syphilitic infections are usually influenced with sufficient rapidity and certainty by the internal use of the mercurials. More severe cases do not come under the influence of the remedy with a sufficient degree of promptness when it is so used; nor will the intestinal tract submit to the necessary rapid increase of dosage. It then becomes advisable to get the mercury into the system through the skin by means of inunctions. Ordinary mercurial ointment rubbed into the skin of the groin, the axilla and the soles of the feet alternately is the method more commonly employed. At the resorts, such as Hot Springs, it is rubbed into the back, and an expert rubber does the work instead of the patient himself. When absorption is thus increased it is necessary that there shall be coincident provision for elimination; the iodids must be pushed somewhat vigorously and frequent baths must be taken. In most cities it is possible to order a Turkish bath once or twice a week. When the facilities for this do not exist, an ordinary hot bath taken just before retiring every second night will answer the purpose fairly well. These measures must be continued until the manifestations have disappeared and the patient begins to gain flesh again.

Malignant, fulminant and neglected cases sometimes demand rapid mercurialization by volatilizing calomel or the metallic mercury. While such cases are rare, this measure must not be neglected when they do occur.

In Europe there is more frequent resort to the hypodermic method of administering mercury than in America. I have no personal experience with the practice, and do not find in the literature sufficient justification for deserting the methods that are more common here and which have thus far given me sufficiently satisfactory results.

In administering mercury internally many prefer to use the bichlorid in solution with iodid of potassium, and a very commonly employed mixture contains one-thirty-second of a grain of the bichlorid and ten grains of the iodid to each dram. This

convenient method of employing the "mixed treatment" is well suited to mild cases, and also permits the use in the same mixture of a bitter tonic such as nux vomica, gentian, or calumbo. It not infrequently seems necessary to add to the specific medication some form of iron which may often advantageously be combined with arsenic. The Blaud pill meets the requirements of many cases; powdered iron in a tablet with arsenious acid and strychnin sulphat or nitrat is also often employed; while others prefer to use some of the scale compounds of iron, such as the potassio-tartrate or ammonio-citrate or a mixture to which some form of quinin has been added.

Well cooked, nutritious food is very necessary to the syphilitic patient. Eggs, milk, rare beef, and bread and butter must constitute the principal portion of his diet. Vegetable food should not be entirely omitted, but many practitioners discontinue any of the vegetable acids while mercury is being administered. Personally I have not seen any bad effects from permitting vegetable diet as usual, with a warning against rhubarb, asparagus, spinach and excessive quantities of lemonade. Alcoholic and malt liquors should be permitted sparingly, if at all. A glass of beer twice a day or one glass of whiskey at bed time may safely be allowed to those accustomed to the use of these beverages.

The question of sending a syphilitic to some health resort, such as the Hot Springs, presents itself so often that we take a moment for its consideration. I have never discovered that the medication there is any different from that with which we are all familiar and which we have all successfully employed for years. Usually the methods at the resorts are so routine that the patient does not receive the same personal care and study of his case that he would receive at home. On the other hand, he is at a place where there is no necessity of concealment of his condition and where he can make it his business to attend to himself, take his medicines and baths regularly, and think of nothing but getting well. To send a patient from his home to a resort for the treatment of syphilis is therefore advisable when he either will not or can not take proper care of himself and implicitly follow directions at his home. Unfortunately the very class of patients who are best able to care for themselves prop-

erly at home and to receive the best attention from their own physicians are the ones most likely to wish to try the Hot Springs or some similar resort. Under some circumstances it is wisest not only to accede to their wishes, but to anticipate them by recommending absence from home during the existence of rashes or of buccal mucous patches. When these have disappeared it is usually easy to keep the patient at home and to give him effective treatment with quite as good a degree of success as any physician at a resort for this class of diseases.

ADDRESS ON STATE MEDICINE.

BY WILLIAM P. MUNN, M. D., DENVER, COLO.

Problems that lie in the borderland of medical science and statecraft constitute the material for the study of state medicine. The relation of the community, as a whole, to certain facts of scientific medical knowledge, the relation of practitioners of medicine to the rest of the community, the prevention of contagious and infectious diseases, and the relation of scientific knowledge to criminal, sociologic and legal problems, are chiefly recognized as lying in this domain, which is unfortunately too much of a terra incognita to the most of us.

We must recognize the fact that the man who steps beyond the limits of the territory usually assigned to him or his profession by public opinion, runs the risk of being charged with impertinence. I trust that the importance of the issues now discussed and the peculiar advantage of viewing them from a medical standpoint will obviate any such judgment upon my words to-day. The subjects to be presented are second in importance to none within the range of either medicine or law alone.

Modern medicine counts among its greatest triumphs those discoveries in pathology, bacteriology and sanitation upon which the specialty of preventive medicine has been built. Insofar as the welfare of states has been influenced through these achieve-

ments, they have become part and parcel of the history of State Medicine.

Eight years ago Europe and America stood aghast at the invasion of Asiatic cholera, which for the first time in a generation set its foot upon the shores of the two continents. Hamburg alone was ravaged by it; other cities withstood the assault with much the same success as did New York, where only a dozen of those directly exposed to the imported infection lost their lives. The preventive measures then enforced by states, nations and municipalities at the bidding of medical science, were based upon a literal acceptation of the discovery of the comma bacillus by Koch. Every effort was directed toward the destruction of this organism and the purification of water supplies by the methods already demonstrated to be efficacious in the laboratories of medicine. Universal success crowned the efforts of the sanitarians and the threatened world epidemic failed to materialize. The genuine science of medicine, the outgrowth of bacteriologic investigation and research, recorded its first great world victory by the use of obstructive tactics.

In 1894 from the same centers of scientific research the industrious workers of medicine gave to the world an anti-diphtheritic serum which was at once hailed by our whole profession as a legitimate and permanent addition to our armamentarium. Diphtheria had been previously a disease whose horrid mortality appalled the stoutest hearts; to-day, with the confident assurance that the use of antitoxin has begotten in our breasts, illness from this cause is easily remedied; contagion is readily controlled. The mortality from this disease has been reduced throughout the civilized world almost three-fourths. Thus has been made a permanent advance that as a life-saving measure can never be equaled by any discovery in any of the arts and sciences other than that of medicine.

During the past thirty years typhoid fever has been fought and is now being slowly conquered by a succession of Fabian movements that bid fair to lead to its utter extermination. For generations confounded with typhus, the clinical recognition of typhoid fever as a separate disease entity was the first step toward its control. The methods by which it was spread began to be understood thirty years ago, but the discovery of its specific

bacillus by Eberth furnished the necessary knowledge that gave definiteness to measures that had hitherto been but illy directed. The destruction of all discharges from typhoid fever patients was one of the first definite measures, but the purification of water supplies by public measures, based upon acceptance of the bacterial origin of the disease, has done more than any other one measure to lessen typhoid fever and bring it under control. It is unfortunately true that American cities, chiefly as a result of their lamentable administrative methods, have not as yet gained the benefits in this line that for a full decade have been the pride and glory of sanitary authorities in a majority of the great cities of Europe. London, Paris, Vienna and Berlin, with their enormous populations and great difficulties in the way of sanitary administration, have reduced typhoid fever mortality to about one-tenth of what it was in Denver in 1896, and one-fourth of what it was last year. This, in spite of the fact that London is forced to draw the bulk of its supply from the polluted Thames and a large percentage of the supply of Paris comes from the filthy Seine. Berlin gets its supply from the river Spree, while Vienna, alone of the four, is able to utilize a mountain supply, as Denver is supposed to do. The secret of the wonderful lessening of typhoid fever mortality in these great aggregations of population is—if the Hibernicism may be excused—no secret at all. The whole world has long known why London, Paris and Berlin, Munich and Hamburg and Antwerp, The Hague and Rotterdam and Amsterdam have succeeded in making typhoid fever so scarce that some of the medical schools lack enough cases to illustrate the disease clinically to their students. *They have adopted slow sand filtration of their public water supplies.* This simple, comparatively inexpensive, remarkably efficient and thoroughly scientific method of treating water supplies reduces the bacterial impurities of the raw water by about 99 per cent. and converts a highly dangerous into a perfectly safe drinking water. The figures that illustrate the effect of these measures upon typhoid mortality are too pregnant with meaning to be omitted from our consideration at this time.

In each 100,000 of population, London's maximum death loss by typhoid fever in any one year of the last ten has been but 16; Berlin's maximum has been 10 per 100,000, and her minimum but

4; The Hague and Rotterdam have had an average death loss of but 4½ per 100,000, and in some years have fallen as low as 2. Contrast with these figures the terrible death loss in Denver from typhoid fever during ten years. The actual number of deaths has been 965; the rate has varied from a maximum of 270 per 100,000 in 1890, down to a minimum of 24 6/10 in the year 1898, while the average rate has been 69 per year.

The indictment that these figures present against certain business interests of Denver and against our methods of state and municipal administration is so severe that it is no wonder their advocates unite to decry that profession of medicine which is responsible for presenting the facts. I make no further comment at this time. Denver is simply a little worse than some other American cities, which seem to have been governed almost wholly by our typically American spirit of haste in the matter of securing their water supplies. Water, as a rule, has been taken from the nearest and most convenient point, without regard to the question of contamination. When typhoid fever has occurred and recurred and finally remained permanently present, it has been regarded as the act of God or as the perfectly natural result of seasonal changes or climatic effects. A false sense of civic pride has too often controlled both citizens and public authorities, so that rather than admit a present evil and adopt measures for its repression, they have united to deny its existence, or to explain away obvious facts or decry and abuse him who attempts to set the truth forth plainly and urge adoption of the obvious methods necessary to remedy existing evils. Rapidly changing municipal administrations, consequent upon our methods of local government, have not fostered the acquisition of accurate knowledge by responsible officials and we have continued to suffer from the prevalence of a disease which is as readily and as certainly preventible as any of the others that afflict mankind. Albany alone, of the large cities of the United States, has recently placed in operation slow sand filters, with the most gratifying and immediate improvement of her water supply and a remarkable lessening of typhoid fever mortality. Philadelphia, Cincinnati and Pittsburg have but recently authorized measures for the same purpose. When the object lessons of these cities shall have been presented to the

people of our country during a series of five or ten years, we may expect a more rapid movement of all other municipalities toward the adoption of these modern methods and preventive medicine will record its third great world victory in our present generation.

The campaign of education in regard to tuberculosis has been in progress for almost twenty years. Presentation of the practical aspects of Koch's great discovery and of the further scientific advances that resulted therefrom, has begun to show results. Special hospitals for the care of patients suffering from this disease are springing into existence throughout the whole world. In many instances they are being built wholly by the state or by state aid at least. This movement is of itself an indication of the very general acceptance of the doctrine of communicability of tuberculosis, based upon Koch's discovery of the bacillus that is the cause of the disease. In all the large cities of the world, the public health authorities now pay particular attention to this disease and have adopted measures for the report of cases, the isolation in some instances of advanced cases, the disinfection of infected premises and the distribution of pamphlets of information as to the methods of destroying the infective agent and describing proper methods of life on behalf of the invalid, so that danger to others may be lessened. This campaign of education is beginning to show results in many cities, where the tuberculosis death rate is steadily and surely declining. Beyond the purely preventive measures we have constantly advancing methods of research, which have for their object the discovery of a serum cure for this disease. While these have not as yet been so successful as we had hoped for, it cannot be that another generation will pass before the fulfilment of our hopes by the discovery of a remedial agent as certain and as wonderful as is the diphtheria antitoxin. It remains only to say that these researches are absolutely within the domain of scientific medicine; they are not haphazard experiments and they are conducted with the approval of the whole medical profession, who follow them with the profoundest faith in their ultimate successful outcome.

The unity of medicine as a science is well illustrated by the world-wide scope of its investigations and their application. Kitasato, the Japanese student who pursued his bacteriologic studies in Koch's laboratory at a time when the plague was prac-

tically unthought of as a world menace, has been able by the application of the same principles that governed Pasteur and Koch in their work, to discover the germs of that very old pestilence that for years had been thought to be extinct. From the 7,000 feet high plateaus of Thibet, where it had for centuries been hidden from the knowledge of the civilized peoples of the globe, this frightful pest has again made its exit and threatens to invade every country upon the earth's surface. Science, in the person of one of its latest recruits, has met it at the threshold of civilization and by careful and patient investigation identified its cause. Kitasato's discovery placed in the hands of every nation the means of studying, of identifying and of stamping out this. the greatest of all contagions, so pre-eminent that in the world's history it has monopolized as its own the names of the Plague, the Pest, the Pestilence and the Black Death. So far as we know, there was never a previous time at which this disease secured a foothold on the American continents. It is to-day, however, well quartered upon our own shores. Argentina, Brazil and Paraguay, in South America, first received it; San Francisco has entertained the unwelcome guest for over two months. One case has occurred at quarantine in New York and one in the state of Washington. Yet the business of the country proceeds as usual; there is no undue excitement; there is no terror; the disease does not spread and cause the death of multitudes as in the past or as it does to this day among the uncivilized faith curers who constitute the bulk of the peoples of India. Why is this the case? Because the regular profession of medicine with its discoveries, its researches and its achievements, stands to-day between the threatened civilized peoples and the threatening pestilence. Because at every seaport, the regular medical profession, with its intimate knowledge of bacteriology, pathology and sanitary science, stands to safeguard our people by the administration of proper quarantine measures. Secure in the knowledge that men, who have never yet failed to meet the greatest emergencies or to faithfully bear the greatest responsibilities, are at their posts of duty and will not fail in the performance of that duty, the commerce, the business and the life of our nation pursues its ordinary course, without interruption, without terror and without any derangement. This beneficent

result has been made possible by Kitasato's discovery—the outcome of our long-accepted doctrines first enunciated by Pasteur and Koch. If the history of medicine could present no other than this one achievement to justify its title to the name of a progressive science, this one would be enough. The result of a purposeful investigation which the medical men of the whole world followed from its modest inception to its triumphant termination with keenest interest and sympathy, the attainments already based upon this discovery have justified the fondest expectations and served to again demonstrate the soundness of the essential principles of bacteriology, which is the mainspring of modern medical progress and which is entirely and without cavil the child, yes the miraculous conception, of the regular medical profession and of none other.

Haffkine's prophylactic serum for the plague has an action analogous to that of vaccinia for smallpox; Yersin's anti-pest serum has an action analogous to that of the diphtheria antitoxin. We have in the success that has attended the application of these two remedies in hundreds of thousands of instances, a successful demonstration of the unity of the laws that govern certain contagions and a still further demonstration that the lines of investigation now followed by medical science lead on to even greater discoveries in realms that are as yet unexplored.

The civilization of new countries has been obstructed as much by malarial fevers as by any of the other agencies of nature or of uncivilized man. It remained for medicine to establish, by a reverse process of discovery, first the therapeutic remedy for the disease; then, after a long interval, the biologic element that causes the disease by its presence in the blood; and last, within two years, Ross has demonstrated that the plasmodium passes from man to man through the intermediary of the mosquito. The life history of this organism in its several hosts is now traced out with marvellous patience and demonstrated with such convincing certainty that we cannot hesitate in accepting without reservation the conclusions drawn from these investigations. Twenty years from now malaria will probably have been as markedly reduced as a cause of death as has diphtheria within the last six years.

The literature of no other science contains any record of discoveries in recent years more far-reaching than these and others

equally important, of medical science. They are in the domain of pure medicine. They effectually dispose of every plea, formulated by the superficial and rehearsed by the stupid, that "medicine, outside of surgery, is not a science." We have all gloried in the demonstration by antiseptic methods that surgery is a science; the stupid, the bigoted, the malevolent, the superficial and the ignorant all have been forced to admit it at this date. But they still like to decry medicine and say that "it is not a science." If the references already made to recent advances in medicine and the prevention of diseases are not sufficient to convince anyone that medicine is an actual science based upon principles and discoveries as immutable as those that underlie its sister sciences of biology, chemistry, astronomy and geology, then that mind is so peculiar that it would not be persuaded although one rose from the dead.

I have dwelt at some length upon these recent world victories of preventive medicine in order that I might with propriety show that interest which the state ought to have in the supervision of medical education and of medical practice. Every community is so at the mercy of practitioners of medicine, when it comes to the recognition of the various contagions, that we cannot overrate the importance of public and official determination of the educational qualifications in this regard of those who assume to recognize and treat disease. It is, of course, well known to all of you that smallpox in its earlier stages may simulate measles, erythema, purpura, syphilis, eczema, varicella or some of the more acute fevers. That a practitioner should have some previous instruction which will enable him to have a reasonably intelligent idea whether the disease is one of those that are not dangerous to the public health or whether it is such a disease as smallpox, should be self-evident to every thinking man. Scarlet fever is, when mild, easily overlooked by the unskilled observer, and thus epidemics spread that result in the loss of many lives. So it is with almost all of the contagions; they are difficult to recognize at first. This is especially true of the plague, which has manifestations that may be mistaken in some of its forms, by the purely clinical observer, for pneumonia, and which in other instances presents a disease picture readily simulating syphilis or general sepsis. The dangers arising from such errors have

been illustrated in San Francisco, where the Chinese doctors, ignorant of modern methods of examination, have been parties to the concealment of a number of cases of plague, even when death had ensued. To lessen the probability of such occurrences, it is customary in civilized states to institute state examinations for the purpose of determining the qualifications of men and women who propose to practice medicine. The public health is to be placed in the hands of these persons; therefore, the state should exercise the prerogative, under its police powers, of determining their fitness.

Germany, England, France, Russia and Italy have rather stringent laws in this regard; so also have many of the states of the Union. Colorado, however, has a law which was loosely framed and has been even more loosely interpreted, so that as it stands at present it furnishes but little protection to our citizens against that incompetence which seeks to masquerade under the banners of medicine, when a properly drawn and well-enforced law should serve to drive incompetents from our ranks. Realizing the inefficiency of our present law, the abuses to which we ourselves were subjected and the dangers to the public health on account of the existing state of affairs, this society in 1898 appointed a committee to co-operate with committees from the homeopathic and eclectic state societies in securing the adoption of a law that would assure the citizens of Colorado of the educational qualifications of those who would in the future enter into the practice of medicine in this state. The bill as framed and agreed upon by these committees was in practical accord with the laws now in force in New York, Pennsylvania and other of the more advanced Eastern states. It was drawn up on lines that have stood the test of the courts in those states and there was no reason to doubt that if it had become a law it would likewise have secured the approval of the Supreme Court of this state. The co-operation of the homeopathic and eclectic societies was essential in securing the law because they are at this time recognized by our existing law; to ignore them would be to threaten their present legal recognition; they were willing to agree with us upon higher standards of education and to have refused their co-operation would have been not only unwise on our part, but would have been unfair to them. That proposed

law was passed by the state legislature and sent to the governor for his approval on the 4th of April, 1899. After a lapse of three weeks and after the legislature was adjourned, so that no effort could be made to pass it over his objections, the bill was vetoed.

It is sometimes wise to refrain from an expression of indignation until a sufficient period of time has elapsed to permit the first overwhelming rush of anger to subside. The expression finally given to the feelings will be the result of matured reflection. It will represent a calm and dispassionate verdict arrived at only upon serious consideration of the issues involved and after weighing with some care the arguments that are presumed to have influenced the mind of one's opponent.

The veto of the bill for the regulation of the practice of medicine in Colorado was a formal statement of opinions upon the value of the medical profession as a factor in modern civilization. It has been held by some of our members to have been a deliberately planned insult. This seems a harsh judgment to pass upon the action of one who has taken an oath of office and who should to some extent at least have felt its binding effect when he penned what has been variously described as "the great state paper of the year," "the characteristic plea of a pettifogger" and "a bid for political support from the lowest elements of the community."

It is my purpose to consider with some care the actual veto and its arguments; to note in passing the general conditions in Colorado, purposed to be affected by the bill in question as it passed the general assembly; to present as briefly as possible some argument why the bill should have received the executive sanction instead of the veto and to finally state some views as to the present duty of the medical profession.

From this introduction it will be plainly seen that it is my intention to eliminate from this discussion any element of personality. Condemnation or approval, therefore, must not be construed as due to personal bias. Governor Thomas has indirectly shown the writer of this article such personal courtesies as would eliminate personal feeling had it previously existed. The veto message, however, is a state paper and subject to the study and criticism of any citizen who takes an intelligent interest in public affairs. It must bear within itself sufficient

strength to withstand fair criticism. Wherein it fails to bear that brunt it will expose to argumentative assault the reasons advanced as a justification for refusing approval to a bill that in its origin and presentation was due to the highest motives of humanity; which owed its passage to naught but reasonable appeals to the best judgment of high-minded men and which found its greatest opposition emanating from commercial sources of doubtful integrity.

It may be wise to premise the whole discussion by a brief consideration of some underlying principles upon which all parties in interest will agree.

The aim of modern government is to provide for the welfare of the community and of all its members, through the authorized adoption of laws that will promote public and private safety of person and property; the advancement of public and private morality; the protection of the health and personal rights of individual citizens in all matters wherein the state may with propriety assume the control of public or semi-public functions.

Among these subjects of legislative control which have long received the sanction of all legislative bodies and the continued recognition of the courts of all nations as lawful, a legal requirement of qualifications of the members of certain trades and professions stands among the first. The public welfare demands that such should be the case. Above and beyond the question of mere protection of individual rights (which is too often simply the indulgence of individual whims) comes the welfare of the whole population, which would be often endangered by the careless exercise of certain trades and professions. And the question of legal control and of lawful requirements assumes greater importance as the character of responsibility increases and the possible dangers to the public welfare become more imminent.

In no branch of modern acquirements is this need of control by law more obviously recognized or enforced with such great strictness as in the interpretation of law and the struggle for administration of justice. No man is permitted to pass judicially upon the problems that affect personal rights, property interests or loss of liberty, unless he is "learned in the law." And the moment this man, "learned in the law," is elevated by the for-

tune of politics, the favor of the executive, or the confidence of the people, to the judicial bench, he is invested with a certain assumption of greater integrity, a temporary infallibility, most pleasing to himself and to those who belong to the same profession. But before any man can hope to attain to this temporary infallibility he must be a member of the bar. That is, he must have passed an examination before a board of members of his own profession, who thereupon decide whether his learning is sufficient in amount and his personality of such a character as to make him a desirable associate. If they approve of him, he is by the action of the court "admitted to the bar." Still further and greater formalities are necessary before he can practice in the appellate courts or before the Supreme Court of the United States. Learning and good reputation are in each instance the requirements of permission; lacking these the court will summarily and even ruthlessly refuse the desired privilege. Thus it will be seen that not every one can go into court and take the time of the court in presentation of a case. Not every one is permitted to take upon himself the responsibility of defending property rights, or of drawing up legal papers, or of administering estates or defending criminals. It is universally recognized that such functions are quasi-public ones and must be exercised only by those who have undergone a proper preparatory course of study.

When you and I enter this building we join with all its other inmates in incurring some risks. One of these risks is that the great boilers in the basement might explode, bringing the building down in ruins and causing loss of life. The state recognizes this possibility of danger. It recognizes that the public is interested in the private business of the men who conduct this building, to the extent of knowing whether those boilers are in good condition and whether the man who takes charge of them is sufficiently intelligent to be permitted to do so. And the state, therefore, makes the owner of the building pay an official for inspecting the boilers from time to time. Moreover, it further authorizes the municipality to examine carefully and issue licenses to men who assume to be "stationary steam engineers." The city exercises the prerogative thus conferred and requires each en-

gineer to have a license showing that he has successfully passed the examinations of the examining board.

When you build a house it is your desire to have it equipped with modern appliances for the removal of excreta and household wastes. It has been discovered by experience that the construction of house drainage systems to meet this want is a difficult problem, requiring some degree of intelligence upon the part of the workman who does the manual labor and some degree of responsibility on the part of the contractor who takes the contract. In order that the health of your family may not be injured through defective plumbing, the state and the city have assumed the power of examining plumbers for the purpose of determining whether they possess the requisite skill and intelligence to do a good job of sanitary plumbing. Those who attempt to do such work without having a license as the result of a legal examination, are arrested and fined. Those who come up for examination and fail to show a sufficient knowledge of the principles of sanitary plumbing and house drainage are refused permission to enter upen the exercise of that trade. And the reason is that the health of the people will be endangered if unqualified plumbers are allowed to undertake responsibilities for which they are not fitted.

In this state the blacksmith who shoes your horse is required by law to have a certificate of capacity from an examining board, composed of well-known members of his craft; if he cannot pass that examination the law drives him out of the business.

These facts are cited to show that it is neither a new or unheard of thing in the state of Colorado for certain trades and professions to be recognized as requiring special preparation and to have entrance into their lawful practice predicated upon the result of an examination conducted by a board in compliance with the requirements of the law.

But you cannot live in any community without discovering that there exist certain conditions, independent of the law, yet as a rule more binding than legal restrictions. I mean, that standing with the fellows of one's own guild, which public sentiment to a greater or less extent decrees. In the trades, this sentiment finds expression through the trades unions. They

differ greatly from medical associations, since they make no claim to any but the most selfish ends. Nevertheless you will find that the spirit of the trades union is an all-pervading one and organized labor insists upon the duty of every skilled workman to belong to his own organization. More than that, it insists upon the co-operation of the unions in matters concerning one only. You will find eloquent advocates of the exactions of the labor unions among the leading politicians of Colorado. I am not sure that such an eloquent advocate of trade organizations does not now occupy the executive chair. The reason for such advocacy is plain. The trades unions are so well organized and take such a prominent part in politics that it is worth the while of politicians to cater to them and publicly defend the rights of the workingman. When it comes to the case of such a profession as that of medicine, the case is different in this,—our organizations have no hard and fast rules such as govern trade organizations and it has never been the habit of medical societies to take part in politics. For this reason our influence in public affairs has been so lessened as to be almost nullified. We may be safely subjected to official insult and calumny, since we may be depended upon never to avenge ourselves politically, and that is the only kind of reprisal that ever worries some kinds of people.

What we have a right to ask of the state, and what we did ask of the state, was this: "That the integrity and usefulness of our profession be guaranteed to society and that standards be established for our members, for the observance of which sanction should be given." This and nothing more the bill as passed provided for; this and more the state long ago gave to the legal and the dental professions; this and more has been given to many of the trades; but to medicine and to medicine alone the veto has denied the right or power to establish "standards for our membership." We asked the state to guarantee to the people that the name physician or surgeon, publicly assumed as a professional designation, should guarantee to society the possession of the absolutely necessary educational qualifications. This guarantee and nothing more the proposed bill would have given; this protection has been denied by the effect of the executive veto.

That very unusual message is a document that repays careful perusal. The newspaper excerpts did not do it full justice. It is a carefully prepared, shrewdly worded and deftly presented argument on behalf of the worst elements of our population. Truth and untruth are so inextricably mingled in that remarkable document that even those perfectly familiar with the subject matter of the discussion may fail to apprehend all the fallacies upheld, all the misrepresentations skilfully concealed, all the mental myopia and moral strabismus that have contributed to the peculiar views so eloquently put forth. For that it is a well-worded and eloquent appeal, the fair-minded critic will not deny. Its writer has not spent his long life before the courts of law in vain. As we read paragraph after paragraph it becomes evident that he has approached this task with the same earnestness that we have heretofore seen him throw into his efforts for the life of some criminal, against whom the evidence had been overwhelming and whose fate rested with a jury of twelve well-meaning, but probably ignorant, men, to whose prejudice, passion, pity, human weakness and human ignorance he in turn appealed with all the arts of the finished orator, all the culture of the widely read scholar, all the shrewdness of a life-long practitioner of criminal law. The effect of such an appeal we have all of us seen, heard or felt at some time in our lives; we know how even the calm, self-contained, resolute mind is often thus swept away from its moorings by a storm of passion. We know how the intelligence thus worked upon temporarily loses its captaincy of the soul and follows the lead of the specious special pleader. But a day, a month or a year afterward, the mind turns back to that occasion and wonderingly attempts to discover what influence it was that for the time being supplanted reason.

It was such an effect as this that the message had upon many minds in our community at the time it was presented. Sane, careful, reasonable men failed to grasp the fact that a measure of vital interest to the common people and to the public health had been successfully opposed and mercilessly slaughtered by the lowest and most venal commercial interests of the city and state. These commercial interests, who pay a large annual rental for the columns of the daily papers in exploiting their indecencies, had controlled the utterances of every paper

in the state. This unanimous newspaper expression may have so influenced the executive that unwittingly the veto became the servant of the threatened commercial interests of indecency, and, willy nilly, was as much their attorney in fact as though its author had been retained by them in any suit at law. The influence thus unconsciously controlling him in turn controlled many other minds through the influence of the veto and a psychic epidemic swept him and them off their feet completely.

That such a message should have provoked reply was but natural; that the replies were in some instances as stinging and as bitter as the comments of the veto itself was but to be expected. But now, when time has somewhat softened the asperity of our feelings, we shall deal gently with the offender as with a loved, but erring, brother.

The veto message begins with this passage: "House bill No. 231 has a somewhat general title. It is designated 'to protect the public health and regulate the practice of medicine in the state of Colorado.' To accomplish this purpose it establishes a medical council and a state board of medical examiners; provides for the examining and licensing of practitioners, with various penalties for the violation of its requirements. Its enacting clause is preceded by the preamble that the public safety is endangered by incompetent physicians and surgeons and due regard for the public health and the preservation of human life demands that none but competent physicians and surgeons be allowed to practice their profession in this state.

"To accomplish these laudable ends it is proposed by law to limit the practice of medicine and surgery to three schools."

The sentence just quoted is the first evidence of misapprehension by the veto of the true purpose of the bill. It did not propose to *limit* the practice of medicine and surgery to the methods of the three schools. It did propose that any person proposing to enter upon practice should be able to demonstrate to one of three boards his possession of sufficient qualifications for undertaking a profession which assumes the responsibilities of life and death.

Once pronounced by the medical council to be capable and a license granted, there was nothing in the bill to limit methods of practice or to impose conditions upon any individual practi-

tioner, except that it was provided in subsequent sections that fraudulent and criminal actions should work a revocation of license. Such revocation is an eminently proper provision. Neither the profession nor the public wants convicted abortionists or murderers to have freedom of practice after their release from the penitentiary.

It is most kindly to assume that the veto misapprehended rather than misrepresented the objects of this bill. It is a matter of fact that misapprehension of the bill was quite general among those who had neither the time nor the inclination to read it carefully and thus arrive at an understanding of its purport. There were not a few physicians already in practice who imagined that it would require them to submit to new examinations and that if they failed therein they would have their present licenses revoked and be driven out of the state. Of course nothing could have been further from the intent of the bill. Retroactive legislation is against public policy at all times. Colorado is among the states which prohibit it and the Constitution of the United States practically does the same thing. So far as I know all laws proposed or enacted in any of the states for the regulation of medical practice, and this one with the others, have contained practically the provision which I here quote from section 16 of the bill:

"Nothing in this act shall be construed to prevent any person practicing medicine and surgery in the state of Colorado, licensed under former acts."

This provision I have reason to believe was studiously concealed from or misrepresented to some reputable men in order that they might be misled into opposition to the bill.

The veto, after this first misstatement, goes on to state that the act was intended to prohibit doctors of divinity and horse doctors from using the title "doctor," when it was plainly evident that no stretch of imagination could possibly have gotten such construction out of or into the words of the act. A vein of attempted facetiousness runs through this paragraph, as well as the one in which the veto refers to the exclusion from the terms of the act of the army and navy medical officers and of licensed practitioners called from other states in consultation. Jocularity in reference to serious subjects may be evidence of

statesmanship, but in this connection it might have well been omitted. Coming as it does at the very beginning of the message, it furnishes abundant evidence of the manner in which the chief executive approached the serious duty of the hour, flinging off coruscations of humor as a pinwheel sheds its sparks, and ending as does the pinwheel in dark and pitiful uselessness.

The veto changes rather suddenly from gay to grave and submits seriatim certain serious charges against the bill, the first of which is in the following words:

"Whatever may be the design of the bill it will not protect the public health."

The "will not" of the above sentence contained truth only through the reflection of the executive's intention; it became effective only when the veto was signed. Had it not been for the veto, this bill would have been a most efficient protection to the public health. Only the fixed determination of the chief executive prevented it from performing its promises. Very great dangers to the public health in this state lie in the assumption by uneducated persons of the profession of treating diseases. Pretenders cloak their ignorance sometimes under assumption of peculiar religious beliefs and again by pseudo-scientific designations, and undertake to treat all kinds of illness. The diseases that are of a contagious nature and difficult of recognition, or dangerous to human life, are undertaken by them with the same lightness of heart as are the duties of statesmanship by the average ward politician. Diphtheria, scarlet fever and smallpox are by some pronounced to be mere figments of the imagination and patients suffering from light forms of these diseases are urged to disregard the dictates of common sense and humanity by mingling with others in such a manner as to spread the contagion. I speak from my personal knowledge of these criminal acts, the perpetrators of which have sought to shield themselves with the cloak of religion. Deluded parents have in this manner destroyed the lives of their own children in this city of Denver. It is a sad but incontrovertible fact. The public health has, in addition, been many times endangered by the purposeful exposure of whole schools full of children by infection bearers from the homes of "Christian Scientists," where the health officers have discovered concealed cases of diphtheria and scarlet fever.

On the ninth line of the third page of the veto occurs this short sentence: "Medicine is not a science."

If this be so, then indeed the mass of mankind have been wofully mistaken in their interpretation of some of the discoveries and a great deal of the progress of the nineteenth century. Since the veto explicitly excludes surgery from this sweeping condemnation, it is not necessary that I should cite instances of surgical advance, which are so many and so marvelous. Medicine alone is challenged by the veto to prove its rights to the designation of "a science."

To the domain of medicine, pure and simple, belong all the discoveries of the last two decades in regard to the causation and prevention of diseases. We know to-day the disease entities that cause tuberculosis, diphtheria, typhoid fever, puerperal fever, erysipelas, pneumonia, cholera, plague, gonorrhea, septicemia, relapsing fever, tetanus, malaria, influenza, yellow fever and anthrax. Based upon the knowledge of these facts there have been developed measures of treatment and of prevention that are so wonderful, so far-reaching, so undeniable, that one would have thought their fame had ere this reached even the cave dwellers of the law and pierced even the ears of those "who having ears, hear not, neither will they understand." The antirabic inoculations that resulted from Pasteur's investigations, the anti-tetanus serum of Behring and Kitasato, the coincident discovery of diphtheria anti-toxin by Behring in Germany and Roux and Yersin in France, Yersin's plague serum and Haffkine's plague prophylactic, Ross's and Bignani's epoch-making observations on the communication of malaria through the intermediary of the mosquito, are neither achievements of science nor of medicine if the veto tells the truth. Nay, instead of anticipating and welcoming these discoveries, the veto intimates that the medical profession obstructed the work, for, and I quote it word for word, "Nearly every advance in the treatment of diseases, in the methods of their detection and in prevention of their occurrences, has been made by physicians in defiance of the regulations of the order."

That sentence should be engraven upon the memory of every physician in the state of Colorado, so that he may remember from whence it came. It breathes hatred and falsehood; it voices

the concentrated lies of the unified force of ignorance and bigotry in this commonwealth. Pernicious as is the veto, it has skillfully concealed its animus until now, but in this one sentence it shows its real face—and the mark of Cain is on its forehead.

When in this city of Denver did the recognition and prevention of contagious diseases find aught but friends in the medical profession? What other set of men have sacrificed time, risked their own lives and lessened their own means of livelihood for the welfare of the whole people as have the doctors of Denver? Whose opposition have they been forced to overcome at every step in the struggle but that of hired lawyers and their charlatan clients?

I feel somewhat competent to speak upon this matter and I assure this audience that the medical profession in Colorado has given its most unselfish aid to every movement in the interest of the public health since it has been my fortune to have any knowledge of the facts. We have seen, through efforts that we inaugurated, a decrease in typhoid fever prevalence from a mortality of 287 in 1890 to an average of 50 in the last three years; we have seen diphtheria mortality reduced, as a result of the efforts of the profession, from a mortality of 267 in 1890 to an average of about 30 in the last five years. These definite figures in regard to these two diseases give but a faint conception of the diminution of illness and decrease of death rate through the efforts of the regular medical profession. More than half of the prevailing illnesses of Denver have been wiped out through the operation of measures *begun and carried out by the doctors of this city.* These benefits the veto falsely asserts to have been due to other causes and attained in spite of the opposition of the profession. Public spirit and self-sacrifice are thus repaid with malicious official insults. It is extremely unfortunate that men learned in other professions have such dim and misty ideas of what the profession of medicine is and what it really does. Had the writer of that veto message had simply a partial conception of what modern medicine is, of the real investigations upon which its progress is based and the spirit of genuine enthusiasm with which genuine discoveries are welcomed and adopted, I am sure he would rather have had his right arm

wither and his tongue cleave to the roof of his mouth than to have written or spoken that horrible sentence which I have just refuted.

Not content with a single misstatement, the veto reiterates it in these words: "The title of the bill as it relates to the public health is a misnomer. This is a common subterfuge; all measures designed to promote a specific interest are ostensibly labeled 'for the good of the people.'"

The proof that the bill was genuine and actually for the protection of the public health has been already submitted. I need not further elaborate upon that point. As to the use of the term "subterfuge" and labeling "for the good of the people," I need only say that doctors are as a rule given to straightforwardness and we had no thought of "subterfuges," but it is now plainly evident why the veto itself was so ostentatiously labeled "for the good of the people" and so heralded by the special interests that should have been outlawed had the bill been signed.

The medical law at present in force in Colorado recognizes homeopathy and eclecticism on the same basis with regular medicine. Sincere adherents of those sectarian beliefs as to therapeutics agree with us that a knowledge of anatomy, physiology, pathology, bacteriology, surgery and obstetrics is essential to assuming the responsibilities of practice. The effort in the bill to recognize already existing rights of these men gives the veto an opportunity for much cheerfully expressed facetiousness in regard to "three systems of materia medica protecting the public health." Rather than allow these three therapeutic beliefs to unite in examinations upon branches that are independent of therapeutic belief, the veto says that it would permit the public health to go to smash. But it fails to say that in spite of this reason being given for non-approval of the proposed bill, the same system of examination in three boards, varying as therapeutic belief, will still exist in Colorado. It is thus only too evident that the veto was designed simply for the perusal of persons not conversant with the act now in force, since the clause thus objected to is still the law in spite of the veto.

May we not ask ourselves whether there is not a deeper and more cogent reason than any that has yet been assigned in the veto? I assure you that there is such a reason, and that

on subsequent pages of the document it makes itself perfectly apparent.

This reason is the fear that the operation of the proposed law would drive out of Colorado those persons who patronize the columns of the daily papers in advertising their peculiar qualifications and methods of practice. No one in this audience needs to be reminded that the newspapers of Denver have a pre-eminent position among the publications of the United States for the nastiness of their advertising columns. In defiance of the laws now upon the books, these papers fairly reek with filthy advertisements and illustrations in regard to syphilis, gonorrhea, spermatorrhea, varicocele, lost manhood, abortion remedies, massage baths for purposes of prostitution, and hundreds of other veiled or unveiled indecencies. When almost all the other states of the Union began to enact laws that prevented creatures of such a stamp from securing a legal foothold within their borders, they turned their eyes to the West for a suitable abiding place. The largest city on the frontier, and a health resort at that, naturally attracted them. The large percentage of floating population in such a city makes it as desirable a center for gulling the public as any ordinary city ten times the size. To Denver, then, many outcasts of the profession flocked and patronized the daily papers with such liberality that newspaper men have admitted to me that half of the incomes of the papers is derived from the sources I have mentioned.

When a stringent law was proposed by the decent elements of the profession of medicine, these indecent hangers-on saw at once that its enactment would eventually drive them out of business.

They called meetings at which certain of the vile elements of society were organized in opposition to this bill. Clairvoyants, fortune tellers, palmists, massage institutes, christian scientist healers, faith healers, charlatans of all known and unknown kinds came together to defend their threatened interests. The newspapers were made to see that the enactment of the proposed law would drive away some of their most regular and best-paying advertising patrons; articles were prepared and furnished to the newspapers showing what alleged interference with personal

rights the bill contemplated. The organized forces of evil lobbied against the bill in season and out of season. The means they employed to influence public sentiment are well known; the means through which the chief executive was influenced are not known, and it does not seem proper to refer to them here. Suffice it to say that the influence exercised was potent enough that he dared not do otherwise than make common cause with the indecent elements of the community against this measure.

I diverge from the straight line of consideration of the veto to say that the immoral influences of the community never made so successful a play upon public sentiment as they did last year. This bill would have cleaned the newspapers of more than half their indecencies. It might have been possible, had this bill become a law, to have followed up its enforcement by the enforcement of other laws now on the statute books, but ignored. You, fathers and mothers, might have had some assurance had this law passed and been enforced, that the ring at your doorbell by a bill distributor would no longer mean the thrusting into the hand of your innocent young daughter of an illustrated circular telling how to prevent conception or to produce abortion. You parents might have been able to feel that your boys would no longer be taught through the columns of the daily papers to regard venereal diseases as trivial affairs to be cured by a few days' surreptitious treatment with an advertised "sure cure." The filth, the abominable pictures, the vulgarities of the daily papers, the advertising bill boards and the widely disseminated handbills, would have been so lessened as to almost seem eradicated. But the newspaper proprietors, the organized forces of charlatanry and the executive veto combined their forces to prevent this most desirable consummation. Vice was and is triumphant. Virtue is humiliated and hides her head lest the mud of the veto slander splash into her eyes and render them sightless.

The veto says: "The bill invests the council and the board with autocratic and oppressive authority. The first shall, by order of the second, deprive practitioners of their certificates and of the right to continue their business."

The above paragraph is quoted in full because it states a common fact in such a manner as to represent grave danger to

liberty, when none really exists. In modern government all power is vested in either individuals or aggregations of individuals, such as boards, councils, legislatures or courts, who by majority vote or by individual act assume power for the community to enforce laws, and who, in so doing, usually not only interfere with individual liberty of action, but confiscate or destroy property, imprison men and even take their lives. What jury verdict ever had a different basis? Why, then, should not a board or council of physicians have power to interfere with ignorant or incompetent persons who assume to practice medicine and thus endanger public safety?

The veto message makes the same assumption that is so often made by citizens when they reach the judicial bench. These individuals assume that doctors may not be entrusted with the exercise of discretion in behalf of the public, while all other classes of citizens, and lawyers especially, are to be so trusted. Three lawyers are appointed by a political friend to act as judges, let us say, of some appellate court. The appointments are made in acknowledgment of political services rendered. Life, liberty, property rights, human happiness, public welfare are all entrusted to these men, and there seems no impropriety in two out of three finally deciding such important matters. It makes no difference that the methods by which they arrive at a decision are as incomprehensible to the average man as the movements of a jelly fish; the individuals so entrusted with authority are lawyers, turned into infallible judges by the magic touch of the executive, and can therefore do no wrong. But three doctors, selected from a profession which we hope is at least as reputable as that of the law; three men of decent, well ordered lives; three men who love their fellows and have devoted their services to the well-being of the race; three such men are not to be entrusted with the responsibility of deciding upon the proper exercise of a public function by persons of whose professed attainments they are especially competent to judge. Oh, most sapient veto; oh, most cogent cozener of muddy and muddled brain cells; oh, most supreme example of superb self-satisfaction, temporarily enthroned in place of power; if this argument of thine shall carry weight in

uniform application to all branches of government, then legislatures, courts and councils shall pass together into outer darkness, anarchy shall reign and all the functions of government cease. Yea, even the power of veto might then be relinquished by the all-wise and considerate one, in momentary fear that he perhaps would err in its exercise.

The veto further says: "The sum of all experience is progress, and the public health is benefited precisely as sanitary laws are observed, investigation of disease and remedies promoted, and men and women left free to choose their own physicians."

Here is as bland, as intricate and as deceptive a statement as was ever framed by any platform orator; the ready wit of the special pleader shows in its construction; three truths are presented in consecutive order, and then an untruth by implication is added so deftly, so naturally, with such a show of fairness, as to almost deceive the "elect," which is the favorite term of the veto in referring to the regular medical profession. On the platform such a specious verbal deception might readily pass uncaught and uncorrected; but when committed to cold type, and read carefully after a year's interval, it is at once seen that the three preceding and undeniable statements neither lead up to nor can by any process of mental gymnastics be connected with the final statement as to "men and women being left free to choose their own physicians."

The implication that the proposed law either directly or indirectly assumed to take away such freedom of choice from any man or woman, or that it authorized the prosecution, conviction or punishment of any one exercising such freedom of choice, finds no basis in the bill itself. Not one word or one sentence could ever be so construed by any sane person; the veto quotes no sentence that could be so interpreted. The bill would have punished the charlatans and law-breakers, not their victims; and it was the charlatans and law-breakers, not their victims, who originated and first presented the argument which the veto here puts forth. These charlatans have already been described in a prior paragraph of the message as "loud in pretence and reckless in the use of remedies, taking advantage of the afflicted by giving assurance to their hopes, only to rob them of health and substance."

Yet notwithstanding this scathing arraignment, the veto proceeds to adopt their arguments and to plead their cause in eloquent and misleading phraseology. It presents in more respectable garb the arguments that they originated; it shows that they ought not to be amenable to any law because laws are difficult to enforce; it pleads that guilt be its own punishment, and that the law shall utter no condemnation; it asks that charlatanry be not only tolerated, but respected. Its sympathy for them finally rises to such a pitch that it joins with them in throwing mud at all who refuse to accept them as professional associates. There is an old adage recently revived whose homely words seem to apply in this connection: "One cannot lie down with dogs and rise up without fleas."

The very grave error into which this veto has fallen is that it has addressed itself to a certain fractional part of the community with an argument for their temporary satisfaction, while it has ignored the interests of the tremendously greater majority, the precedents of good government and eternal principles of truth.

Nothing is more firmly established than the power of the state to exercise police functions for the protection of its people. To this end it has ever been within the power of lawmaking bodies and of executive officers under the law to interfere with the liberty of the few for the welfare of the many. The veto says: "We do not deprive men of the right to carry arms because a few commit murder." How much truth there is in that assertion anyone can say who has seen concealed weapons confiscated in the police courts and those who carried them sentenced to heavy fines or imprisonment in lieu thereof. The state does deprive men of the right to carry arms, when concealed. This is done rightly; it is an eminently proper exercise of the police power; public sentiment approves the law and the courts, even in this state and in this city, do, from time to time, spasmodically enforce it. Murder and lawlessness are thus restrained, although not absolutely prevented; public order is better; respect for the rights of others is paramount; peace and good will are promoted among men. And all this in spite of the fact that the prohibition of carrying concealed weapons does not attain to the perfect results that were desired when the people empowered their law-

making representatives to enact that law. The parallel between bearing arms and practising medicine has been instituted in the veto itself. Let us carry it out to its legitimate conclusion. The uneducated man or woman who attempts to act as a "healer" is a bearer of concealed weapons of the most deadly sort; they secure the confidence of the people by false pretenses of harmlessness and ply their deadly weapons for pay, as does the hired assassin; they are as great a menace to the public health and as notorious a threat to the well being of the community as is the "bad man" of the frontier town, who with swaggering effrontery and blustering boasts asserts his ability and intent to shoot down law-abiding citizens. They are birds of a feather; they make common cause against prohibitive laws; they find the same advocates whether in or out of public office; one kind of offender claims as many innocent victims as the other; and in well-ordered communities, with well-settled civilization, they are equally and together tabooed.

The drunken bad man who sends a bullet through the brain of a sleeping child is on no lower level in regard to the sane, civilized members of the community, than are the moral perverts who permit their children to die of contagious diseases without invoking the aid of medical science. They claim that the illness is not real, but simply a belief in sickness, while with horrid brutality they force sick and dying children to be upon their feet, pretending to play until the enfeebled heart gives up the struggle and the child drops dead. These incidents have occurred in Denver to my knowledge, as a result of official investigation, and such criminals are the ones for whom the veto especially and eloquently pleads. In addition to the crimes within their own families, such persons try to spread contagion by sending infection-bearing children into the streets, upon the street cars, into the public schools and into all other public assemblies. For the benefit of such a class of moral perverts the veto presents arguments that if universally applied would annul the police powers of the state in every regard and place our well being entirely at the mercy of the criminal classes.

May the time soon come when we shall take our stand in line with other commonwealths that place the welfare of the many above the ignorance of the few.

Following the lines which it has already laid down, the veto then proceeds to indulge in a little stage play, which is as plainly an appeal to the galleries as the veriest ranting that ever graced the boards of a cheap theater. It says: "An advertisement, a criticism of the board, the application of an unusual remedy, testifying against the defendant in a suit for malpractice, challenging the infallibility of something hoary with age and crowned with failure, these and similar deeds might well be cited as sufficient to set in motion the machinery of the star-chamber. A land like ours, which founds its policy upon justice will tolerate no such tyranny as this and I will not believe that any profession needs such an aid either for its protection or its support."

See with what fury of forensic assault the veto precipitates itself upon the unresisting form of the man of straw which it has so ingeniously and laboriously built? "This man of straw," says the veto, "Is a veritable Frankenstein; the liberties of the country are not safe if I permit it to hold together; therefore, and since the people have their eyes upon me, I will tear it to pieces." Which he then proceeds to do with such apparent rage as to deceive himself—almost.

The description of any authorized proceeding under the law by the term "star-chamber" is a common and much-prized method of orators in arousing the antipathy of the semi-cultivated against any proper and necessary measure. It is a phrase as frequently and as effectively used as the "dull thud" of the penny dreadful novels; also it appeals to about the same class of minds in about the same way. What is there that actually savors of the methods of the renowned "star-chamber" in an action which must be publicly conducted in accordance with the well-recognized rules of legal procedure and which is subject to review in all its details by appeal to the ordinary and appellate judiciary of the state? What is there proposed that is not done by every other board having executive power in the state of Colorado? The Fire and Police Board of Denver may, and often does, in secret session and without review by the courts, take away the business opportunities and means of making a livelihood of the saloonkeeper. The veto would, by parallel reasoning, deprive them of this power. But would the people of Colorado approve such deprivation of authority? Every executive function performed by state or city

would be invalid if the argument of the veto in this regard is a proper one. But I cannot suppose that it was presented for serious consideration. It had its effect, however, upon the galleries and needs just enough recognition here to classify it where it belongs and nowhere else.

A third series of charges elaborates upon the assertion already disposed of, that it was proposed to restrict the profession to three schools and then to limit the number for business purposes, finally asserting that "A medical trust is to be established which shall regulate supply and demand and be in absolute control of the product which forms its basis."

Those are the exact words of the veto. The wildly imaginative tale did not originate in the brain of the newspapers alone, but in the crudite nerve centers of the chief executive of the great state of Colorado. A trust is in these days and in this community a name with which to conjure; in this instance the word was used to play upon the beliefs of the ignorant and pamper the desires of the vicious. A medical trust can be readily seen by anyone who gives the subject serious thought, to be an impossibility; that the proposed law could have fostered a trust is an assertion that no one who has read the bill and who knows what a trust is, could for one moment believe. The nature of medical service is so personal, so individual, and the circumstances of each patient so different, that in the very nature of things such supervision of service and pay as would be necessary to form a trust is utterly beyond the bounds of human performance. The villainous business organizations of the charlatans, which advertise widely in the name of a certain person or a special method of alleged cure, which give the "professional" services of some poorly paid starveling to the thousands of victims that in person or by letter fall under their care, come as near to being "trusts" as anything usurping the honored name of medicine can come. The proposed law, if signed and rigorously enforced, would have driven such dishonest associations out of Colorado. But who raised the cry that the bill would create a "trust?" These very charlatans themselves. It was the old trick of the thief raising the cry, "Stop, thief," and pointing the finger of suspicion at the innocent old gentleman whose pocket had been picked; a muddle-brained policeman takes the innocent party into custody,

thanks the thief for his readily proffered testimony, and allows him to escape. The veto message has played the self-important policeman upon us; we were taken into custody and accused before the people of a crime that had really been committed against us, the actual criminal being the complaining witness.

What an opportunity such a case affords for a capable, conscientious, discerning judge. How he would have allowed the false witness to commit himself and have led him on from one entangling admission to another; how he would have finally, in a burst of honest indignation, swept away the whole tissue of falsehoods, vindicated the innocent accused and placed the actual criminal in the pillory. But this was not to be. The arresting officer constituted himself the judge. Purring hypocrisy poured its false story into willing ears; a ready hand wrote it into the records of the state as a final verdict against the accused. The slander became a state paper and the proposed law was killed.

Toward the end of the message the veto for a moment seems to apprehend the gravity of the charges it has made and failed to sustain against us. For one instant the garment of the special pleader falls away from the form of the man beneath it; for one instant the siren voice of the apologist of evil is silenced and a man's voice rings forth in truthful and natural expression. This voice says:

"The medical profession is a noble one. It has done much to cure ailments, to alleviate suffering and to prolong life. Its ranks are filled with men of lofty ambitions and of spotless character, who have given and are giving their lives to the development of its mission and the uplifting of humanity through its ministrations. Its pages are luminous with great names and great accomplishments."

Listening to these words one is amazed that the preceding casuistry, special pleading and misrepresentation should have emanated from the same source. The frank truthfulness of this one sentence brings to my mind a picture that is neither old nor fading; I realize again the impress of rugged manliness made upon my mind when on May 30, 1898, I saw a gray-haired veteran of the Confederacy marching after the ranks of the Grand Army of the Republic and carrying in wind and rain the starry banner of the reunited republic, under whose folds he and his ancient

enemies from the north land now live in loving harmony. That man was Governor Thomas.

But the picture is too good to last; the words that for an instant rang true have ended in silence; the garb of the special pleader is again drawn over and conceals the form of manhood. Expediency succeeds in persuading Conscience, that a profession admitted to be a noble one, luminous with great names and filled with men of lofty ambitions and spotless character, is not to be entrusted with the supervision of its own membership. The recreant hand takes up the slanderous pen and signs and attests that state paper which is an eternal libel upon our profession and an insult to our citizenship.

It may be seen from this review of the veto message, and the principles that it advocates, that we can hardly fail to adjudge its writer as wanting in sympathy with the medical profession and unable to appreciate measures that we know to be necessary for the welfare of the whole people. This lack of sympathy may be perfectly conscientious, but even so it is a dangerous attribute in any public servant. Such mental and moral characteristics do not enable one to rise to our highest conceptions of duty, either as a citizen or as a public officer. The views advocated by the veto are a source of danger to the state and those who hold them may be calmly pronounced unfit to be entrusted with further public duties. Peculiarly constituted minds are especially unfit to be entrusted with legislative functions. That the sanitary interests of the state or nation should be entrusted to the vagaries of such a mind, either in legislative action or committee consideration, would be a disaster which as faithful citizens of a sovereign state we should endeavor to avoid. The progress of science in the United States is largely dependent upon the opportunities for research that the national government affords to the Bureau of Animal Industry at Washington. We have a strong belief in their value. We desire to see the medical departments of the army and navy maintained upon a high and ethical plane; we desire to see quarantine measures on behalf of the nation rigidly enforced by the Marine Hospital Service in accord with the most advanced scientific knowledge of the day; we want these services to have ample powers and sufficient resources for their work. Therefore it should be our

pleasure and our duty to use every endeavor to have their control in friendly and competent law-making hands.

If then the course of events shall place the writer of the objectionable veto message in that private life which he ornamented prior to 1898, he will in such retirement have none but the kindliest sentiments of every physician in this audience. He will, we hope, when in physical pain and anguish, call, and not call in vain, for that assistance that our profession never denies to suffering humanity if it be at all within our power to give it. And whether blessed relief is given him through the medium of one of the anesthetics or analgesics that the good God permitted some plain physicians to discover, or whether it comes to him through some swift, sure and painless procedure of modern surgery, due to the researches of our oft-slandered fellow workers, let us all hope that when the ministering hand has done its work and he is free from anguish, his mind will revert to that official libel to which he affixed his signature in 1899, and that he will thereafter publicly and manfully withdraw it and apologize to the honorable profession of medicine.

Mr. President, our citizenship, with all its inherent rights and privileges, is as dear to us as to any other class of our people. It should not be incumbent upon us to demonstrate with arguments of set speech and proof as on the witness stand that we value our privileges as citizens or that we are devoted to the welfare of the communities in which we live. Nevertheless, this unwelcome and distasteful duty has been put upon us and we have endeavored to perform it without any semblance of undignified boasting. The rights to which we are equally entitled, with all others of our fellow citizens, we claim without hesitancy and will exercise to their fullest limits. The protection which the laws of the land guarantee to other professions and to the trades we claim also and will continue to claim until our demand results in compliance. In order that that desirable end may be attained, this society and each and every member thereof has a right to the honorable exercise of every privilege of citizenship, to the use of every honorable argument and the persuasive effects of every honorable influence that can be exercised. The triumph of righteousness may be delayed, its ultimate accomplishment cannot be prevented, and I see somewhere in the fu-

ture an ultimate realization of the measures for which we have hitherto striven in vain. That accomplishment shall be basis of still further striving, of greater effort and of grander attainments.

THE SYMPTOMS, PROGNOSIS AND TREATMENT OF GASTRIC ULCER.

BY W. T. LITTLE, M. D., CANON CITY, COLO.

The frequency of gastric ulcer is recognized by all, and in most cases its diagnosis is not difficult, although it may require some observation and study of the patient. It is far more frequent in women than men. Thus Welch[1] found in 1,699 cases that 40 per cent. were male and 60 per cent. female. Brinton[2] puts the average higher—2 to 1. Fiedler[3] examined 2,200 bodies with reference to ulcer or ulcer scars, and found 20 per cent. women to 1.5 per cent. men, which gives the proportion 14 to 1.

It may occur at any age, but varies considerably in different periods of life, appearing with the greatest frequency between the ages of 20 and 30. The average age of the male patients is greater than that of the female.

The order of frequency of the chief symptoms of gastric ulcer is about as follows: Pain, vomiting, hemorrhage, tenderness, pallor, constipation, thirst. The pain is definitely located in most cases, but not always confined to one area. With few exceptions it is felt in the epigastrium; frequently in the epigastrium and back; very rarely in the back alone. It may radiate to the right or left hypochondrium, down into the abdomen, up into the chest, between the shoulders or into the back of the neck. A patient of mine, a young lady, was sent to Colorado for her health, having a slight morning cough and a great deal of pain in the chest, mostly on the left side. Although she had gastralgia and vomiting at times, little attention was paid to

them either by her physician or herself. Physical signs were practically negative, but the frequent pains were believed to come from the lungs. Stomach rest promptly relieved her. The pain may be referred up the esophagus, and is then felt as a burning or gnawing under the sternum. Its character varies from this ill-defined burning or gnawing to the most intense suffering. It may be continuous with exacerbations excited by food, or, as is oftener the case, the pain is felt only after eating to be relieved when the stomach is emptied either into the duodenum or by vomiting. It may occur when the stomach is empty, and occasionally is even relieved by food. We must remember, however, that pain is not always present, and indeed will be absent in 7 per cent. of these cases.

Vomiting: While I have placed vomiting second in the order of frequency, it might with almost equal propriety precede pain. The time of vomiting varies not only in different subjects, but frequently in the same individual. The statements of authors diverge widely on this point. Ewald[4] and Luke[5] say the vomiting occurs soon after eating. Boas[6] puts it at the height of the paroxysm of pain, and Osler[7] not for two or more hours after eating. These conflicting statements serve to show that the time of vomiting is not a factor in diagnosis. The quantity of vomitus usually corresponds to the amount of food and drink taken.

Hemorrhage: Hemorrhage is present in about 50 per cent. of the cases. As haemoptysis not rarely ushers in the symptoms of pulmonary phthisis, so hamatemesis may usher in the symptoms of ulcer. It occurs at all ages and equally in both sexes. The mortality from hemorrhage is greater in males, for what reason we do not know, unless it is that the recuperative power of the female is greater. Death of females under 30 years of age is rare. Hood[8] some years ago called attention to the rarity of fatal cases of hemorrhage in gastric ulcer in young women. In twenty years—1870 to 1890—at Guy's hospital, London, there were 36 cases of hemorrhage due to gastric ulcer; and though there were 29 of this number (27 females and 2 males) under 30, but one case proved fatal, and that a male.

The bleeding is apt to be quite free and is usually preceded by attacks of pain of some days' or weeks' duration. One

hemorrhage alone may occur, but as a rule there are several extending over as many days, and the individual may become almost exsanguinated. Death rarely occurs from one copious bleeding, but follows as a result of the repeated losses. Whenever the hemorrhage is severe blood appears in the stools as dark, tarry-looking matter, and when it decomposes the stools become very offensive. But not infrequently the hemorrhage is so slight that it all passes into the bowels.

Hosslin[9] says that even so much as 500 c. c. may only give to the stools the characteristic tea color. Its presence or absence, therefore, must not be left for the patient to decide, but the stools should be carefully examined microscopically for haemin crystals. Care should be taken not to confound these with crystals of sulphide of bismuth, as the bismuth salts are frequently given for ulcer.

Tenderness: Can be elicited in the majority of cases and is usually limited to a small spot just below the ensiform cartilage. One of my patients during a gastralgic attack complained for several weeks of a small spot of tenderness in the fourth interspace near the left edge of the sternum. Much dependence cannot, however, be placed on this symptom, because of the ease with which we can usually elicit tenderness from chlorotic and hysterical girls.

Pallor is present in about four-fifths of patients suffering with ulcer of the stomach, and these will be found to have a haemoglobinaemia of varying degree. The remaining number will show a healthy, even ruddy complexion.

Constipation: Will be found to exist with a majority of these patients, but has no significance. It may be due to the fact that most ulcer patients are women. Excessive thirst may or may not be present. When present it is due, I believe, to an excess of H Cl.

Prognosis: Welch[10] computes the average duration of gastric ulcer to be from three to five years, but says this estimate is not of great value on account of the absence of any regularity in the course and duration of the disease. In cases of very protracted duration, such as forty years in a case of Habershon's and thirty-five in one of Brinton's, it is uncertain whether the

symptoms are referable to the persistence of one ulcer, or to the formation of new ones, or to the sequels resulting from cicatrization. In 110 cases analyzed by Lebert and quoted by Welch, 44 of which were fatal, the course was latent until the occurrence of perforation or of profuse hemorrhage in 15 per cent.; the duration was less than 1 year in 18 per cent.; from 1 to 6 years, in 46½ per cent; from 6 to 20 years, in 18 per cent.; from 20 to 35 years, in 2½ per cent. As to the percentage of cures authors vary. Welch[11] gives 85 as the percentage. Leube[12] 74 per cent. cured of 556 patients treated by himself. Ewald[13] gives 75 per cent., and Debove and Remond, from a study of 100 patients, show only 50 per cent. complete cures.

Greenough and Joslin[14], in an analysis of 187 patients treated in the Massachusetts General Hospital, give the following interesting figures: At the time of leaving the hospital there were cured 64 per cent., relieved 18 per cent., deaths 8 per cent., otherwise 9 per cent. After a lapse of five years they gained information as to the condition of 114 of the same patients with this result: Cured, 40 per cent.; not cured, recurrence, 36 per cent.; deaths due to stomach trouble, including those dead in hospital, 20 per cent.; deaths, cause unknown, 4 per cent. A recurrence took place in one-half of the cases. This is interesting in that it shows the great liability to recurrence, and must impress us with the seriousness of the affection. And this experience will quite agree with our own in private practice.

Death is usually due to hemorrhage or perforation, although it may occur remotely as a result of cicatricial stenosis of the pylorus, or cancer developing in the scar of an old ulcer. In connection with this I would relate a recent experience I had when the symptoms pointed to perforation, with general peritonitis, and the patient recovered. A young lady, aged 22, was the subject of several recurrent attacks of gastralgia and hemorrhage, extending over a period of about four years. In the fall of last year she suffered daily with gastralgia for several weeks, culminating in severe hemorrhages, during which probably three to four pints of blood were lost. On the second day of the hemorrhages she complained of severe epigastric pain and tenderness, which rapidly spread up under the ribs, into the flanks

and down over the abdomen. The tenderness was exquisite and she lay with the thighs flexed. There was delirium of a muttering and emotional type, during which she would frequently cry out with pain. The belly was full, but not tympanitic; there was no vomiting (she was kept under the influence of morphine), and the temperature never rose above 100°. At the end of forty-eight hours she began to rapidly improve. I have never been able to satisfy myself as to the exact condition present at that time, for perforation and peritonitis are so universally fatal that the recovery seems to preclude these.

The outlook, however, in the large majority of cases of gastric ulcer is most encouraging, for we can cure 40 per cent. of our patients permanently, and relieve another 40 per cent.

Treatment: Until recently surgery has found little encouragement in the treatment of ulcer. Operations had been performed for perforation, and occasionally for hemorrhage, but they were operations of last resort, and the results could not of necessity give much encouragement. The past few years have seen a fresh impetus given to surgery of the stomach, and the operative treatment of ulcer is being placed on a sound and rational basis. Our greatest danger will be in letting our enthusiasm for surgery outweigh our past experiences with the medical treatment, for the latter will undoubtedly continue to cure a majority of these cases. Operation should be limited to those cases wherein medical treatment has proved a failure. Andrews and Eisendraht[15], as the result of clinical and experimental work, reach the following very sound conclusions:

1. "The result of the practice of the best modern surgeons warrants the statements, previously made on theoretical grounds, that only operative interference can save the lives of a part of the patients affected with bleeding ulcers of the stomach, viz., those not improved by internal medicine."

2. "Surgical intervention is to be recommended, first, in small, repeated hemorrhages; secondly, in severe ones occurring more than once, especially if more than 500 c. c. are lost at each hematemesis."

3. "A single, copious hemorrhage is not necessarily an indication for operation."

Medical treatment, or, more properly, dietetic treatment, has for its sole object rest of the affected organ. Rest in bed is essential, and the patient should be kept in bed not less than four weeks, and in bad cases even longer. When hemorrhage has taken place, or the ulcer is irritable with pain and vomiting, the patient should be fed entirely by the bowel for the first week or ten days. If, by that time, all gastric symptoms have subsided, we may begin cautiously to add nourishment by the mouth, continuing the rectal feeding at longer intervals. I give them peptonized milk, or plain milk well diluted with lime water (4 to 6 tablespoonfuls to the glass), egg albumen water, beef tea or stock soups, purees made by thickening clear soup with well-cooked arrowroot, finely-ground rice or thoroughly baked wheaten flour, somatose added to milk, coffee or cocoa. Toasted cracker may be served with the clear soups. Ice cream is well borne and usually very grateful to the patient, and I allow it freely.

Patients who are doing well are usually hungry by this time and clamor for a more substantial diet, and the physician and nurses must exhibit much tact and firmness. At the end of the second week I drop the rectal feeding and increase the quantity of the liquids, adding egg nog with but little whisky or brandy, oatmeal well cooked and strained, served with cream and very little sugar. Gruels made from other of the breakfast foods may be allowed for variety, but they should always be well cooked and preferably strained. At the beginning of the fourth week scraped beef is allowed once and later twice a day; this is best made into a little mass and broiled. Minced breast of fowl, baked or broiled fish and very soft egg may alternate with the scraped beef. Milk and lime water or carbonated water, or plain water, may be drunk with the meal, and is preferable to tea or coffee. If at the end of the fourth week our patient has been free from pain, tenderness and vomiting for at least three weeks, we may allow him out of bed. He may now have in addition a small, mealy, baked potato, toast, custard, rice or tapioca pudding, oranges, stewed apples and any other light dish he may crave. This diet should be continued for at least two months, after which, if all is well, an ordinary diet may be resumed, avoiding harsh foods or great quantities.

From the beginning I have the patient take a half-teaspoonful to a teaspoonful of artificial Carlsbad salts in a large cupful of hot water every morning before eating, and if there is much thirst, indicating an excess of H Cl., this is repeated during the day. Besides its corrective action on the stomach, this regulates the bowels if constipation exists.

For the anemia iron is necessary, and while the particular form in which it is given is of little consequence so long as it is assimilated, I have gotten the best results from haemoferrum, four pills a day. Arsenic may be of service, preferably as arsenious acid. It is usual to find a long list of remedies recommended for diseases that resist drug treatment, and ulcer is no exception to the rule. They seldom prove valuable except in the hands of their enthusiastic exponent. Of these, bismuth subnitrate and nitrate of silver I have tried, but could never satisfy myself that they were of any appreciable benefit.

The treatment of hemorrhage I will not consider except to condemn haemostatics by the mouth, such as tannic acid, acetate of lead, etc., for I have seen them excite nausea and vomiting, and thereby provoke renewed bleeding.

At the first sign of recurrence, and particularly in hemorrhagic cases, the patient should be sent to bed and dieted for two or three weeks. In this way we may check an activity which might result seriously, as well as keep the ulcer in a more favorable condition to heal. This will occur, as I have said before, in 40 per cent. of our cases. To the surgeon we will now look for help for the remaining number.

BIBLIOGRAPHY.

[1]Pepper's System of Medicine, Vol. II, p. 480.
[2]Fleiner, Krankheiten der Verdauungsorgane, p. 226.
[3]Cited by Ewald, p. 383.
[4]Loc. cit., p. 398.
[5]Leube-Specielle Diagnose 1, p. 260.
[6]Spec. Diag. und Therap. der Magenkrank, 11, p. 36.
[7]Practice of Medicine.
[8]The Med. Society Transactions, London, Vol. XV, p. 283.
[9]Münch. Med. Wochinsch, 1890, No. 14.

[10]Pepper's Sys. Medicine, Vol. II, p. 501.
[11]Loc. cit.
[12]Loc. cit.
[13]Diseases of the Stomach.
[14]American Journal Med. Sciences, Vol. 118, No. 2.
[15]Annals of Surgery, Oct., 1899.

DISCUSSION.

Dr. C. D. Spivak: We ought to be very grateful to Dr. Little for bringing up this important subject. It seems to me that, judging by the trend of the literature on the subject, we are going through a period which will be known as the "Gastric Ulcer Period," just as the last decade may be called the "Appendicitis Period." And, indeed, the two diseases have a great many points in common.

In both diseases the suffering of the patient is intense; although the diagnosis is easily made, the prognosis is uncertain; severe cases may recover, and mild cases terminate fatally. I consider both ulcer of the stomach and appendicitis the most dangerous diseases that medical men have to deal with. The other similarity is that in every case of ulcer of the stomach, as in that of appendicitis, the surgeon should always be consulted. Such cases ought to be always under the constant observation of both the medical man and the surgeon. The statistics show that out of every hundred living human beings five of them suffer at one time or another in their lives from ulcer of the stomach. We can, therefore, see what an importance the study of ulcer of the stomach should be to the physician.

The time which is so grudgingly given to those who discuss papers will not permit me to enter into a great many points which I would like to bring up.

LOCALIZATION OF A BULLET-WOUND OF THE SPINAL CORD — REMOVAL OF THE BULLET FROM THE SPINAL CANAL.

BY HOWELL T. PERSHING, M. D., DENVER, COLO.

Mrs. A., aged 42, was admitted to the Arapahoe County hospital, in the surgical service of Dr. W. B. Craig, April 10, 1900. In the absence of both the visiting neurologists, it devolved upon me as one of the consultants to report the neurological features of the case to Dr. Craig.

On February 27, 1900, two bullet wounds had been inflicted by her husband with a revolver at close range. One bullet passed superficially under the skin and was easily extracted. The other entered the back about the level of the eleventh rib and six inches to the left of the median line; its course could not be ascertained.

At the time of the shots the woman remained conscious but immediately fell, felt a numb sensation from the waist down, and found herself unable to move either of the lower limbs. Severe pains in both buttocks and thighs soon set in. Control of the bladder and rectum was lost; the urine would accumulate for a number of hours, without dribbling, and then be spasmodically and unconsciously evacuated. These symptoms had persisted up to the time of examination.

Condition on examination: The muscles above the waist were under normal control, but there was complete absence of voluntary action of all the joints of both lower limbs. Faradic irritability was entirely lost in the paralyzed muscles except a scarcely perceptible contraction of the right peroneal group. The muscles were flabby and somewhat wasted. There was a small bed-sore on the right buttock.

The plantar reflex, Achilles reflex and knee-jerk were absent, but the anal and perineal reflexes were quite lively, although the irritation was not felt. All forms of sensibility were lost up to a definite line passing across the external genitals,

the front of each thigh, the buttocks and the sacrum. This line corresponded very closely with that marked in Head's diagrams as separating the sensory areas of the first and second lumbar segments of the cord. There was much complaint of pain in the thighs and buttocks, which could not be controlled without full doses of morphia.

The facts of the history and examination were not difficult to interpret. The distribution of the paralysis and sensory loss, together with loss of control of the bladder and rectum and trophic changes, made it certain that there was a lesion of the spinal cord. The limit of the sensory loss showed the upper limit of the lesion to be at the junction of the first and second lumbar segments, a part of the cord which is enclosed by the eleventh dorsal vertebra. The lowest sacral segments could not be involved because the perineal, anal, and vesical reflexes, which are dependent on the integrity of these segments, were retained. That a considerable portion of the lumbar enlargement, including the lower four lumbar and at least the first sacral segments, was severely injured was evident from the complete loss of reflexes and faradic reactions in the lower limbs.

An opinion was accordingly given that the cord was damaged at a part mainly opposite the twelfth dorsal vertebra, extending both upward and downward, but not so far as the upper border of the eleventh dorsal or the lower border of the first lumbar vertebra. This damage was evidently inflicted at the moment the shot was fired, but whether directly by the bullet itself or indirectly through fracture of a vertebra could not be told. In either case it could not be affirmed that the persistence of the symptoms was due to persistent pressure on the cord. This was only a possibility, the probability being that the original damage was sufficient to account for all the symptoms whether pressure was maintained or not.

Independently of the neurological examination Dr. G. Stover took a skiagraph of the lower spine which gave a faint and doubtful indication of a foreign body between the twelfth dorsal and first lumbar vertebrae. Dr. Stover was not willing to place much reliance on this indication, but as it harmonized with the neurological localization it was accepted as corroborative evidence.

The patient had entered the hospital with the express purpose of having an operation performed. In consultation with

Dr. Craig it was agreed, for reasons already indicated, that the possibility of restoring any considerable degree of function was extremely slight. On the other hand, the localization was so definite and the risk attending an exploratory operation of so little moment that it was deemed wise to operate in the hope that at least the pain might be relieved. The whole matter was frankly explained to the patient and she unhesitating asked for the operation.

Dr. Craig operated April 21. The spine and laminae of the twelfth dorsal vertebra were first removed. Nothing abnormal could be detected except the absence of pulsation in the exposed dura. It was then decided to remove the spine and laminae of the eleventh dorsal rather than of the first lumbar vertebra, because a mechanical obstruction would be more likely to exist at the upper than at the lower limit of the lesion. This was rapidly done and the finger then detected a foreign body in the part of the spinal canal within the eleventh dorsal vertebra, a little to the right of the median line. This was seized with forceps and easily removed, when it was found to be a misshapen bullet of about 42 caliber. Nothing further was done except to dress the wound in the usual way.

On recovery from the anaesthetic the patient gave surprisingly little evidence of shock and said that she was to a great extent relieved of her pain. This relief continued for a number of days and much less morphia was needed than before the operation. There was no restoration of function, in spite of the patient's pathetic attempts to find some improvement in this respect, and after some days the pains began to return with their former severity. On April 29 and 30 it was noticed that the pulse rate was rising and strength failing. Less food was taken and finally it was refused altogether. Death occurred from constantly increasing exhaustion May 15. No post-mortem examination was allowed.

This case seems to me to call for but little comment. Notwithstanding the remoteness of the possibility of doing substantial good in such a case it was on the whole wise to make the attempt. The operation was rapidly and skillfully performed and the unfortunate woman certainly lost nothing of the very little that it remained possible for her to lose.

TREATMENT OF FRACTURED PATELLAE BY OPERATIVE MEASURES.

BY F. H. M'NAUGHT, M. D., DENVER, COLO.

In presenting reports of cases for the treatment of fractured patella by operative measures, I will not burden you with the history of each individual case. We practically have to consider only two general varieties and two general causes, i. e., the simple and compound fracture and those produced by direct or indirect violence.

It is only a few years since that it was thought advisable to do an arthrotomy for fractured patella; and at present date I question the advisability of doing an operative procedure for every case of fractured patella that we may meet. Yet, when we study our cases and classify them and consider the surroundings in which they are placed, we will often find that it is quite proper to do an operation for this injury. I do not wish to be misunderstood, and wish to make the point very clear and to emphasize it—that I do not think it proper to do an operation for this form of injury outside of a well-regulated hospital or where we do not feel quite safe regarding asepsis. My cases have all been done in a well-regulated operating room where I had perfect confidence, if there was no slip in technique during the operation, I should have no infection from material used.

The five cases that I report occurred within the last eighteen months and presented the following indications for the operation:

Case I. Mr. Underwood, the first one that I have the privilege of presenting to you, received his injury January 11, 1899, the condition being brought about through muscular action. He was treated without operation in the usual way and with the Agnew splint, and was discharged April 22, 1899, with fairly useful limb, union being fibrous.

On May 30, 1899, he refractured the patella, again from muscular action. When I first saw him for this latter injury the

fragments were widely separated, the effusion in the joint cavity being very extensive. The extensive separation of the patella found in this refractured case, being nearly 2½ inches, was due to the usual causes—joint effusion and muscular retraction. The great development of muscle on this man's leg was unusual on account of his having suffered an amputation of the other leg a few years since, which of necessity produced greater strength and muscular development in the remaining leg.

Operative treatment for this refractured patella brought to me very serious considerations on account of the loss of the leg. I felt that it would be almost impossible to again bring about as useful a leg as this man required without operative measures; I also felt keenly my position in advising an operation, as the operation itself might possibly admit of infection with ankylosis, or destruction of joint, and remote possibility of an amputation. After presenting all these facts plainly to the patient and obtaining his permission for the operation, I cut down upon the patella and wired it with silver wire.

The minutiae of the operation, in fact for all the operations I have done, consist in thorough preparation of the patient by having the skin of entire leg made surgically clean. The line of incision you will note. The flap was turned back and protected by hot moist sterilized towels. The joint cavity was turned out and thoroughly cleansed of all clots and broken-down tissue and irrigated with hot saline solutions, no antiseptic solutions being used. Much care was used to prevent destruction of the epithelial tissue of the synovial membrane, as I feel that great manipulation of any serous surface is attended with some danger on account of opening up avenues which may allow of infection. The fragments were then approximated and the silver wire encircled the patella, penetrating the extensor muscle at the superior border and also penetrating the ligimentum patellae.

In this case I was unable to keep the fragments in close apposition even after the ligature had been applied, and I found it necessary to drill through the bones near the fractured surface and wire them at this point. The periosteum was then tightly closed, as was the prepatella tissue, with catgut sutures. The fibres of the extensor tendons found on each side of the joint

surface were also sutured, no drainage being used. The flap was returned to its original position and closed with silk worm sutures. The parts were aseptically dressed. A posterior splint was applied, after which the limb was heavily encased in a plaster of paris cast which was allowed to remain for four weeks, when it was removed. The skin stitches were then removed and slight passive movement commenced. As you will note by examining the case, the function of the joint is nearly normal and without a question the union of the fractured patella is a bony one.

In three of the other cases this operation was done for primary fracture with the following indications for the operation: All of them were workingmen. In each the fragments were widely separated; I felt that only good results and useful limbs could be obtained for these men through operative measures, and they acquiesced in my opinion. The operation was done, and the results were all that could be desired, all recovering with probably bony union and almost complete function of knee joint. Every precaution was taken to avoid infection, which I consider the most essential point in this mode of treatment for fractured patella.

Case II. The second case that I show you was one that presented no question in regard to mode of treatment; yet a greater amount of anxiety was felt for this case than for the others in that I considered it an infective case at the time of operation. The history is as follows: A. Picconi was injured March 8, 1900, at Colorado Springs, by falling and striking on edge of plank walk. After three days this man was referred to me for treatment. The joint surface was enormously distended, so much so that I was unable to satisfy myself regarding the exact condition. The leg was swollen from ankle to the groin, and the ecchymosis that appeared a few days later was so great that the man felt that his leg must be mortifying. My experience has been that we have a greater amount of effusion in the surrounding tissues following this injury than in fracture of the long bone. In all of my cases the ecchymosis has been very pronounced and extensive. The temperature was practically normal, the pulse slightly accelerated. Extreme heat was applied to the leg for a few days, when the general swelling was ma-

terially diminished; great distension of the joint cavity still existed. At the end of the sixth day after the injury pain located about the knee joint was complained of, and swelling seemed to increase. Temperature rose from 99° to 103°. The man had a slight chill, with facial expression indicating much suffering. I felt that the knee joint was being rapidly infected and after consulting with his friends and explaining to them the danger this man was in, with a possibility of complete destruction of knee joint and with remote possibility of amputation of the leg, operation was decided upon. In cutting down upon the fracture I found what seemed to be a serious condition. The patella was broken in five pieces, two of the fragments being almost entirely separated from periosteum and surrounding tissues. These loose fragments of bone were removed, and the joint cavity, which was entirely filled with clots (which I considered infected), was washed out. The cavity was thoroughly irrigated and cleansed, after which the remaining fragments of bone were approximated and held in apposition by silver ligature. In this case a through and through drainage was made which was allowed to remain in the joint for four days. Other than the drainage the treatment was the same as in the other cases reported. This man made an uninterrupted recovery. I expect in a short time to obtain a greater range of mobility and hope eventually to have the joint in almost normal condition.

In four of my arthrotomies for fracture the silver wire alone has been used. In the other case of refracture of patella from muscular action the Parkhill clamp was used. The result of this operation by this mode of treatment was as satisfactory as the others, and yet I am free to admit (in the doctor's presence) that only in exceptional cases would I deem it advisable or proper to use the Parkhill clamp—for this reason, that in cases of fracture of the patella produced by muscular action the line of fracture is usually at the lower third of the patella, which of necessity leaves a small lower fragment for the application of the clamp; yet in this case the fracture was nearer the center of the bone, so that I had fairly good surfaces for the application of this most excellent device. In this case perfect results were obtained, union being probably bony and functional results for the knee joint almost perfect.

Case III. One other case of arthrotomy for fracture I wish to cite, although not a patella case—one in which the olecranon process of the ulna was fractured and separated from the shaft by an interval of about two inches. From the history of the case I am unable to state whether this injury was produced by direct violence or muscular action. I made an effort to approximate the fractures, but was unsuccessful; and, as I felt there were possibly other bony disturbances extending into the joint cavity, I thought that I was warranted in cutting down upon the fracture and wiring the olecranon to the shaft. In making this operation I found that the coronoid process of the ulna had also been fractured and was found loose in the joint cavity. This process of bone was removed and the olecranon fastened by silver wire to the shaft of the ulna. In this case it was necessary to drill a hole in the shaft about one inch from its fractured point. With silver wire passed through this aperture and encircling the olecranon, passing through the quadriceps extensor, I was able to hold the fractured bone in apposition. The wound was then closed and practically hermetically sealed in the usual way, after which a plaster of paris cast was applied with the arm in an extended position. The cast was removed at the end of five weeks, skin sutures removed, and very slight passive motion made. At this time the man wished to return to his home in Iowa and I deemed it advisable to again apply cast. Communication from him the first of June revealed the fact that the joint was in good condition and that he was able to flex it at this time at nearly right angle. Without a question, the function of the joint will be entirely restored and power of extension will probably be normal. I do not think it would have been possible to bring the bones in perfect apposition through any other mode of treatment.

My experience leads me to the belief that in the silver wire we have the ideal method for uniting these fragments. I am aware that this mode of treatment has been strongly criticized on account of the so-called foreign substance being left in the tissues which eventually may have to be removed. My observation with this material does not extend over sufficient length of time for me to express a positive opinion regarding this matter, yet my experience has been so satisfactory to the patient and to

myself that I feel I shall continue to use it till I find some strong objection for its non-use. In a case where the separation is not great and where the muscular action is weak I can conceive that most excellent results can be obtained by chromacized catgut.

The original Malgaigne hook which was used to approximate the fractured patella, and which was discarded for many years on account of the infection which usually followed its use, has many principles about it which in our day of antiseptic surgery can be used with great advantage in this form of injury.

There are many other appliances for this purpose involving the principle and varying only in trifling details from the original Malgaigne hooks.

To summarize: What are the indications for an arthrotomy for fractured patella and under what conditions should a joint cavity be opened?

First—When the fractured parts cannot be returned to their normal condition by manipulation and the fractured surfaces held in apposition by some form of surgical appliances; i. e., where the effusion, muscular retraction, and tissue intervening between the fractured surfaces are so great that the parts cannot be approximated, operation is advisable.

Second—When the fracture is of such a nature that serious primary defect is to be expected or where the secondary defect is liable to increase with time. Often in fractures about the joints, where only fibrous union alone can be hoped for, time often increases the defect rather than removing it; namely, by allowing a greater separation at the junction of the fracture through absorption and lengthening out of the fibrous material found between the fragments.

Third—When any suspicion of infection follows fractures, in my estimation we are warranted in opening joint surfaces, thoroughly removing the source of infection, and making such application for the treatment of the fracture as the case may demand.

Fourth—We must recognize that refracturing or rather rupturing of the uniting fibrous medium is liable to occur in non-operated cases. Stephen Smith says that in considering the prognosis of fractures treated without operation we have to con-

sider the danger of rupture of the newly formed bond of union, and his statistics show a startling frequency of this accident. Knowledge of this fact is of great import in considering operative measures, as it has been shown that the majority of cases of so-called refractured patella refuse to unite, so that we should be forced to an operation for the correction of this latter defect if we would hope to obtain a fairly useful limb.

Osseous union rarely obtains by treatment without operative measures, while in the cases treated by wiring, or through other surgical procedures, bony union is always to be expected.

Fifth—We must recognize certain conditions and surroundings when we take into consideration the operation of arthrotomy for fracture, especially of the patella; i. e., our patient must be in the best possible state, as infection is less liable to follow normal condition than abnormal.

Sixth—No operation of this kind should be considered other than in surroundings that are most favorable for the avoidance of infection; since practically there is no danger from ankylosis after arthrotomy if the principles of asepsis are strictly adhered to.

Seventh—The remote possibility of infection following the opening of joint surfaces should be explained to the patient or friends and permission be obtained before an operation is considered.

Eighth—Statistics and the history of operations done for fracture of the patella in well-conducted institutions give better results than the non-operative methods. Usually the accidents that have occurred from this operation result from some defects in the details of operation which are avoidable.

Ninth—The element of time is to be considered, and Prof. Hamilton states that in non-operative cases the bond of union may be considered complete in six or eight weeks, but that for six months the patient should walk only upon crutches and the knee joint should be constantly supported unless it is completely at rest; while Dr. Phelps reports that the patients treated by operative measures should be able to return to heavy work in approximately ten weeks.

IMMUNIZATION FOR TYPHOID FEVER—A REVIEW.

BY H. W. M'LAUTHLIN, M. D., DENVER, COLO.

The efforts made during the past few years to produce artificial immunity from typhoid fever must be considered as especially far reaching in importance. In 1892 were reported the experiments on animals of Brieger, Kitasato and Wasserman. They grew typhoid bacilli in thymus bouillon for three days. They claimed that an antitoxic body in the thymus cells reduced the virulence of the typhoid poison so that after heating the thymus culture to 60° C. for 15 minutes it became sufficiently attenuated to be safe to use in man and at the same time sufficiently protective.

They injected six mice with 0.5 c. c. of this thymus bouillon, heated as above. The animals showed no signs of illness. After twelve days the six protected and three control mice were inoculated in the peritoneal cavity with 0.3 c. c of the most virulent typhoid bouillon. The three control animals died in fourteen hours. The protected animals all survived without signs of sickness.

Passing the work of other investigators in this line, special interest centers in the work of Dr. A. E. Wright and others, of the English army, teachers in the army medical school at Netley, particularly because of the favorable opportunity of these men to test the value of the inoculations on British soldiers in India and South Africa.

In the British Medical Journal of January 30, 1897, and also in the Lancet, appeared the first extended paper of Dr. Wright on this subject. In it he said that the vaccination experiments against cholera by Haffkine prompted him and his associates to take up the question of establishing artificial immunity from typhoid. His first published vaccinations were made in July and August, 1896. Regarding the principles of the proposed method, he said that all vaccination has for its object, first, to achieve a degree of immunity equal or greater to what comes from an actual attack of the disease, and second, to obtain this immunity

without risk to life or health. The first can only yet be obtained by inoculation with the micro-organisms, or their products, of the particular disease. The second can be accomplished in a number of ways; as, for example, in vaccination against small-pox by inoculating with micro-organisms which have lost their virulence for man by passing through certain animals; or as in Pasteur's vaccination against anthrax, where use is made of micro-organisms artificially attenuated; or, thirdly, by using measured quantities of dead but still poisonous micro-organisms. The latter method was adopted by Prof. Wright.

His vaccine consisted of a pure cultivation of typhoid bacilli in broth or agar-agar. When time was allowed for the material to be obtained from Netley, it consisted of lysolised cultures (1% Lysol), four weeks old, of virulent typhoid bacilli. This pure cultivation, with its contained toxines, is sterilized by subjecting it to a temperature of 60° C., thus destroying the typhoid bacilli, or possibly in some cases merely so lowering their vitality that they cannot produce fresh poison, or can produce it only in such quantities and of such a character that it cannot prove fatal when introduced into the tissues of man.

The vaccine is thus not a serum nor a lymph. In its production living animals and tissues are at no stage required, and the only use made of animals is to test the strength of the fluid to insure the proper standard.

In general characteristics the vaccine corresponds closely to that used by Haffkine in his cholera inoculations. The strength of the vaccine varies with the number and the virulence of the bacilli it contains; so the dose has varied, but seems to have been between 0.3 and 1 c. c. m. The latter makes a full dose for a man, and represents an amount which would prove fatal to a 350 gram guinea pig.

Dr. Wright gives the following symptoms as occurring after a person has been inoculated: From a small dose there is locally slight tenderness at the site of the injection (generally the flank). There is a feeling of chilliness two or three hours after the inoculation, with a slight rise of temperature and some restlessness at night. In twenty-four hours the symptoms are gone. From larger doses the local tenderness increases and extends upward to the armpit and downward to the groin. A reddened patch

two to four inches in diameter appears at the place of injection and red lines of inflammation extend from this up to the armpit. The local symptoms are at their height in twelve hours, still very sensible at twenty-four hours, and are gone in about forty-eight hours. Constitutionally there are usually feelings of faintness or collapse within two or three hours after the injection. Sometimes there is vomiting. The appetite is lost. There is considerable fever and sleep is much disturbed. Within a day or two the symptoms are gone and the patient feels normal. Occasionally a patient looks poorly for two or three weeks. Considerable oedema may occur at the site of injection, and in one case it extended to the linea alba in front and downward to the groin. Wright thinks he largely prevents this by administering calcium chloride.

The British Medical Journal (January 20, 1900) says editorially: "The patient (after inoculation) passes through what may be called a modified attack of typhoid fever, an attack modified both in degree and in kind. If the bacilli are killed, the reaction, however smart it may be, is usually temporary; if the bacilli are not dead the process is more prolonged and it is probable that the protection is also greater and more prolonged. It is possible that as the process becomes better understood and the necessity for a greater degree of protection becomes evident, the living but modified virus may be more generally used."

Through the courtesy of Dr. Smith, of Littleton, I can add the testimony of a physician who himself took the inoculation, Dr. Charles Peters of the Imperial Yeomanry. In a recent letter he says: "You know there is an anti-typhoid inoculation on trial now, and this war (South African) will prove it to be good or not, as many of the troops have been inoculated. I had it done. I thought it would be worth trying. They injected 1 c. cm. into the muscles just above the anterior superior spine of the ileum. In four hours it commenced to work. At first it makes you feel very faint, then perspire, then high temperature (102°—104°), with a frightful headache. Some it makes vomit, so, of course, I had my share of that. This lasts twenty-four to thirty-six hours and, in the meanwhile, the whole of the side becomes very sore. It sets up an acute cellulitis at the site of the injection and a lymphangitis extending to the axilla and groin, where an adenitis

is developed. In my case it did not spread to the groin. Then you get well very quickly and the side is quite normal in three or four days. I can assure you it is not pleasant at the time, but if it lessens typhoid or prevents it, it is worth the day or two of illness, at least so I think now; but if I had to take it again I might think otherwise."

The blood of patients who have submitted to the typhoid vaccination becomes in some measure poisonous to the typhoid bacillus, as it immobilizes and agglutinates them, i. e., it responds to Widal's test. Wright considers that this sedimenting power of the blood is a trustworthy criterion of the immunity of the person who furnishes it. He admits, however, that before this can be called proven, the fact must be explained that persons who die from typhoid show the specific sedimentation reaction in exactly the same way as patients who recover from this disease. He believes that it may be assumed that every animal is working its way up to the acquirement of immunity from the moment of infection up to the time its struggle with the disease finally ceases. A degree of immunity which would amply ward off a fatal issue if given on the first day of the disease may be of no avail if acquired later in the attack. So in typhoid the sedimenting power of the blood may be acquired too late in the attack to save the patient's life. The sedimenting power of the blood acquired from an attack of typhoid is not greater than that acquired from an inoculation with dead typhoid bacilli.

The blood of an inoculated person is also tested to see how far it can be diluted and preserve its sedimentation powers. The sedimentation units are then called preventive units. For example, a blood which shows the sedimentation in a tenfold dilution is said to contain one preventive unit, and so on.

As to risk from the inoculations. It is claimed that as the bacteria employed are dead, and so incapable of generating new poison in the system, the injection of small and measured amounts of these dead bacterial cultivations would risk life no more than the injection of a medicinal dose of morphine. Haffkine has made nearly 100,000 anti-cholera inoculations without a serious symptom.

As to probable duration of immunity. With typhoid as with smallpox vaccination the immunity conferred probably dimin-

ishes more or less rapidly. Wright thinks that if, as seems probable, the duration of immunity will be told by a series of blood examinations, it would seem that immunity would last at least a few years, and thus carry a young adult over the period of greatest susceptibility. Dr. Foulerton, in the Middlesex Hospital Journal, claims to have examined the blood of nine people, two years after inoculation, and in four out of nine cases it showed a definite agglutinative reaction. The British Medical Journal (January, 1900), says editorially: "Evidence has been established that the effect of inoculation is prolonged for eighteen to twenty-four months."

Sir Dyce Duckworth, lecturer of medicine at St. Bartholomew's Hospital, in an interesting report of two cases which he inoculated successfully with Wright's vaccine, says that a second inoculation, ten or twelve days after the first, is desirable to secure the full benefit of the vaccine.

In reviewing the literature on this subject, one finds the reports few in number and often incomplete because no subsequent blood tests are given. For instance, we find that in 1896 eighteen medical officers, either in or preparing for service in India, were inoculated. Two hundred and fifty men volunteered at Bangalon in December, 1898. In March, 1899, there were 420 men inoculated at Lucknow, and so on. The following reports are from Prof. Wright. Of 200 attendants at the Maidstone Hospital, 95 were inoculated. During the subsequent epidemic of typhoid there none of these men were ill. Of the 105 who refused to be vaccinated, 19 contracted typhoid. At Khartoum 6 subalterns consented to be vaccinated. The remaining 2 refused and said they would take chances. One of the latter died and the other was very ill from typhoid. None of those inoculated took the disease.

A detailed account of the results of typhoid inoculations in the Indian British army, by Prof. Wright, appeared in the Lancet and also in the British Medical Journal in January, 1900. The statistics are as follows:

Period of observation	About 9 months
Total number of men under observation	11,295
Number inoculated	2,835
Number not inoculated	8,460

Number of cases of typhoid among inoculated..... 27 or 0.95%
Number of cases of typhoid among uninoculated.....213 or 2.5 %
Number of deaths from typhoid among inoculated... 5 or 0.2 %
Number of deaths from typhoid among uninoculated. 23 or 0.34%

Of the inoculated cases who had typhoid, 5 were admitted to the hospital within 19 days after inoculation. Two of these died.

In connection with these figures, Prof. Wright calls attention to the conditions under which the inoculations were performed. They were made in the latter part of 1898, and early in 1899, while he was serving on the Indian plague commission. As the commissioners journeyed from place to place, the soldiers were told of the supposed advantages of the inoculations, and volunteers were called for. The younger men and those newly arrived were especially advised to protect themselves, and these were the ones who usually took the inoculations. Those who considered themselves safe on account of age or a previous attack were disposed to take chances. As insufficient vaccine could be prepared before they left England, it had to be prepared en route. The bottles of vaccine had to be repeatedly opened in order to withdraw material when needed. Guinea pigs, for standardizing the vaccine, had to be carried about from place to place, to keep them under observation. As an incubator could not be carried about with them, to prove the continued sterility of the vaccine, the latter was sterilized at 60°C. previous to making each new series of inoculations. Wright considers it possible that some of the vaccine was thus weakened by repeated sterilization. In no case was it possible to make two successive inoculations. The doses were always such as to produce fairly severe reaction in the men. The necessary statistics after the inoculations were difficult to obtain, owing to frequent changes in the stations of the men. In certain cases the inoculations were taken in the actual presence of a typhoid epidemic, and some of the men were undoubtedly incubating the disease at the time they were inoculated.

These statistics, moreover, do not include officers, as no accurate statistics were available in their case. Dr. Wright thinks, however, that several hundred inoculations have occurred

among the subalterns alone. Among these only five cases of typhoid, all said to have been mild, have come to his knowledge.

Dr. Wright, in closing his article on results, says: "Even assuming that no greater protection could be conferred in the future than that which appears to have been conferred in these preliminary inoculations, the result obtained would, in the aggregate, be a significant one. Taking the figures as they stand in the summary of the table, and calculating on the figures 1,800 and 460, which represent in round numbers the average number of cases and deaths from enteric fever, in the British army in India, as deduced from the figures of the last three years, there would, on the assumption that the whole army, or the susceptible portion of it, were inoculated, be an annual saving of over 1,000 cases of enteric fever and of nearly 200 lives."

Curiously enough, there have been numerous reports from India to the effect that the anti-typhoid inoculation also confers a certain amount of protection against malarial fever. Regarding this, Prof. Wright says that the only record he has bearing on it is that of one regiment. The question was asked each man whether he had had malaria either before or after the inoculation. Of 121 men who stated that they had had malaria before the inoculation, 111 were entirely free from it six months after, when the question was asked. The other 10 said that they had been practically free from it. Two men who had never had malaria previous to the inoculation said they had it slightly within the six months after. But this question is of secondary importance.

It is not surprising that the consensus of opinion seems to be that Wright's work has demonstrated the harmlessness of these inoculations, and also, which is Wright's modest claim, that some degree of protection against typhoid is conferred by them. It is quite possible that changes in the technique of the preparation of the protective material will be necessary. Wright himself admits that there have been uncertainties in the method of standardization which he proposes to deal with later. Fuller statistics are absolutely necessary and especially the following up of the inoculated cases.

The Lancet says, editorially (January 27, 1900): "Wright's results are not enthusiastic. A much larger number must be

quoted. But these are sufficiently convincing to make officers willing to take the inoculations and to advise their men to do likewise. We agree with Wright that a certain measure of protection seems to have been conferred. Typhoid has hitherto been the greatest cause of death to British soldiers in peace or war. At the present time a most critical test is being made of the inoculation among troops in active service in South Africa."

The British Medical Journal, in January, 1900, says, editorially: "These figures (given above) are all in favor of the inoculations. Many of the attacks of typhoid in the inoculated seem to have been comparatively mild, although the fact that the general type of the disease at the time may have been mild must be remembered. The evidence thus far seems to show that the inoculations do exert a distinct effect on typhoid among the troops in India. Let the troops to be sent to South Africa be vaccinated during their period of training, before they go to the seat of war. Officers, nurses and members of the army medical corps, except those who have passed through an attack of typhoid, should be inoculated. Better still, if the treatment can be extended to the rank and file of both regulars and volunteers."

The latest report seen by the writer is a letter from the front, South Africa, and published in England, May 5, 1900. It states that it is still too early to know the results of the anti-typhoid inoculations in the present campaign.

Frank Billings, M. D., of Chicago, in the A. M. A. Journal, February, 1900, says: "The production of artificial immunity from typhoid fever, as a prophylactic measure, by inoculation with typhoid cultures, has been practiced with apparent success. The inoculations, however, are still too few and the results on man too indefinite to allow of positive deductions. Enough has been done to prove the harmlessness of the operation and to encourage a continuance of the practice. Many of the experiments have been weakened by the failure to apply the serum test before and at proper and repeated times after the inoculations."

Our American soldiers, in the late military campaign, suffered heavily from typhoid. Prof. Victor C. Vaughan, in his recent paper on "Conclusions reached after a study of typhoid fever among the American soldiers in 1898," says: "Every regiment in the United States service in 1898 developed typhoid fever,

and in all about one-fifth of all the soldiers in the national encampments. The deaths from typhoid were more than 80 per cent. of the total deaths. One who has lived in a camp in which typhoid fever is prevalent is liable to develop this disease any time within eight weeks after leaving such camp."

It is greatly to be hoped that the official reports of the results of the inoculations in South Africa may show another stride forward in the praiseworthy efforts to control this great scourge, not only of modern armies, but of young adult life everywhere.

DISCUSSION.

Dr. C. E. Edson: I should agree with Dr. Mitchell in thanking Dr. McLauthlin for bringing to us these reports, some of which we have seen from time to time, of a work that promises so much in the future. It is perhaps hardly fair to discuss a portion of this paper which he did not read, namely, the slight reference he made to the sufficiency of typhoid inoculation in cases of malaria. The literature of that subject has not been large, but such as we have of it makes one thing certain, especially in view of the most interesting report of Dr. Vaughan to which Dr. McLauthlin refers, of the diagnosis of malaria and typhoid fever in our armies during the summer of 1898. Certainly upon the evidence of the diagnosis alone, as suggested by Dr. Vaughan, and upon our knowledge of the relations of bacterial toxins one to another, one would be inclined to say that a case of malaria favorably influenced by these toxins, or cases of malaria not developed, were not malaria but were fever, and that in the epidemic then among the troops the inoculated men did not take the disease.

Dr. McLauthlin: I should say that I was unable to find that there was any examination of the blood made in the cases of the men who stated they had not had malaria during the six months. There was one paragraph which I did not read, which was a report from South Africa, published in London last month, from a medical source, which states that it is still too early to know the results of the anti-typhoid inoculation in the present campaign.

SHOTGUN WOUNDS OF THE UPPER EXTREMITY.

BY EDMUND J. A. ROGERS, M. D., DENVER, COLO.

It is my purpose to-day to report a few cases where portions of the upper extremity have been extensively lacerated by charges of small shot. There is nothing special in these cases, but they serve to illustrate the general treatment that I follow, the main points of which are the absolute saving of all possible tissue, removing nothing that I am not sure is dead, avoiding all irritation by the unnecessary use of strong antiseptics and other destructive applications, and resorting to operative procedures only where demanded to preserve or restore function. In the majority of shotgun wounds the destroyed area is so open that the question of drainage does not intrude itself, the question being rather, to what extent can we close the wound; and where we see these wounds immediately the extent of infection is not so great as in other lacerated and crushed wounds, and therefore severe inflammation is more easily guarded against. One or two of the cases that I shall mention I have before referred to in other connections, but they are nearly all reported for the first time.

CASE I.

F. S. was shot at short range in a labor riot in the City park in 1892. The charge blew away the upper portion of the bicipital region, entirely removing the superficial tissue, all the external muscles and the greater portion of the shaft of the humerus, leaving the vessels surrounded by the nerves, the triceps and the skin covering them. No attempt was made at artificial repairing. The parts were allowed to contract up towards the shoulder, and satisfactory union occurred, leaving a most useful arm which many of the members of the society have examined. The patient, when last seen, was capable of almost all motion not necessitating the absolute raising of the humerus from the shoulder joint, and would pass unnoticed unless called upon to perform some such extensive movement.

CASE II.

F. W. received, in November, 1894, almost identically the same wound, except that the bone left exposed was not shot away. Here recovery was almost perfect. The biceps reunited, although, at the time of injury, the body of it seemed almost entirely destroyed. He stated, two years subsequently, that the arm was as useful although not quite so strong as before the accident. The contraction of the soft parts at the time of these injuries gives an appearance of a much more extensive destruction of tissue than really occurs.

CASE III.

J. M. was shot in the same region but at longer range and with buckshot in April, 1896. He received itinerant treatment, and did not come under my care until the following September. I then found the upper arm much enlarged with numerous suppurating sinuses leading down to the bone, and the bone much comminuted but surrounded with soft callus, the diseased area extending, apparently, the whole length of the humerus; and through pressure upon and implication of the nerves and vessels, the whole arm was paralyzed and quite useless. The constitutional symptoms from toxaemia were severe and the patient exhausted and desirous of amputation, if it promised relief. I performed a long series of operations which ended in almost complete removal of the shaft of the humerus from just below the upper articulation down to the condyles. The nerves had not been destroyed in the original injury, and their function slowly returned and the patient made a most satisfactory recovery, now having a very useful arm with which he can perform most of the duties of life. The patient informs me that the hand is now practically normal and that he can lift about 100 pounds with the arm.

CASE IV.

The next case that I shall mention occurred as far back as 1883. A. J., while out shooting, discharged his gun into the palm of his hand. The charge of fine shot entirely blew away the metacarpal bone of the index finger, together with all tendons going to that finger, exposing the next metacarpal bone, and

removed the thumb near the base of the first phalanx. Some skin, however, was left about the thumb so that I did not deem it wise to touch it at all. As the index finger was left without tendons or attachments except the skin and tissue at the web, I split the finger down on the outside, removed bones and tendons and used the tissue and skin to fill in the lost space in the hand. I removed no skin whatever except the tip of this finger. The result was without suppuration or further loss of tissue and was satisfactory in every particular, and he has ever since had a very useful hand. He is here for your inspection.

CASE V.

H. S., a boy, aged 16, while out shooting on October 28, 1893, accidentally discharged his gun while drawing the muzzle by his right hand in the direction of the arm. The charge entered the center of the wrist just above the annular ligament with an upward and outward direction, and, spreading, shot away all of the tissue in this direction, carrying away the lower portion of the shaft of the radius, but leaving the articulation, together with all the tendons and muscles about it, the median and radial nerves and all the superficial tissues of the lower anterior and external portions of the arm. The case was placed under my care in St. Luke's hospital. My first efforts, extending over some weeks, were simply to preserve and restore vitality to the parts not directly destroyed by the accident. I employed no antiseptic in the wound and there was no suppuration.

On December 13 I operated, first cutting down on the ulna and removing the same length of bone as had been shot away from the radius and wiring the divided ends together, in this way approximating the two injured surfaces of the radius. I then united the median and radial nerves and sutured attachments to such tendons as had not been destroyed. The result was partially satisfactory, and was improved by supplementary operations. The result was by no means a perfect hand, but still a much better hand than no hand at all. I present it here for your inspection. It would have been better if I had removed more of the ulna, as I allowed such a weak union of the radius that fracture and displacement of the ends subsequently occurred, leading to lateral displacement at the wrist. The innervation,

however, is almost perfect, and the patient is now an instructor in telegraphy and typewriting, using this right hand in these duties as well as performing many other useful manipulations. The total shortening of the forearm is over four inches.

DISCUSSION.

Dr. C. A. Powers: These are excellent examples of surgery, and particularly gratifying because much of the work was done before the days of asepsis, as we understand the term now. This illustrates the fact that many men fail to realize that amputation should be the last thing of which the surgeon should think. Dr. Rogers is certainly to be congratulated on these cases, and especially such a case as that of the boy.

Dr. L. Freeman: I have been interested in the fact that an amputation is not always necessary. It is a serious thing to take out the upper arm bones completely, and yet, as Dr. Rogers says, the tissues can be taken up until the arm is much shortened, and the arm still has its uses. I remember taking out the humerus in a case, and although the patient had an arm that would swing around, he was able to carry around buckets of water and wash dishes in a restaurant. There was a case in New York some years ago in which they tried to replace the lost bones with those of animals, but that has been given up. Dr. Rogers also stated that it is not proper to use the stronger antiseptics. A salt solution is just as good. I think it is a good plan to go over the lacerated skin with a razor for the purpose of removing the dirt, and I think I have noticed in those cases in which that has been done that the wounds have got along better than they otherwise would.

Dr. Rogers: I don't know that there is anything further to be said. I would like to emphasize the fact that this boy is now an instructor in telegraph and typewriting. I would also like to repeat that no antiseptic whatever was used on his arm until after the second operation, when there was a little suppuration and it became necessary. If an antiseptic had been used at the first I would not have got the result I did.

In the man's hand you see here, although this was a lacerated gunshot wound, the little points of skin which I turned in to cover the ends of the shot-away bone of the thumb all lived, and as Dr. Powers has so nicely emphasized, this was in 1893, before the profession had grasped the present ideas of surgery.

PULMONARY EMBOLISM, WITH REPORT OF CASES.

BY F. E. WAXHAM, M. D., DENVER, COLO.

Judging from the small number of cases reported one would conclude that pulmonary embolism, or infarction, was a very rare disease. The first reported case was in 1852, and from that date to 1893 Sperling (Max) was able to collect but thirty-three cases, to which he added two, making altogether thirty-five cases. I have been able to collect the histories of but seventeen cases, to which I am able to add but one case coming under my own observation. I am convinced, however, that pulmonary embolism is more common than is generally supposed. I have recently learned of two cases occurring in the practice of my associates that have never been reported; one following childbirth and terminating fatally, and the other associated with an acute phlebitis also terminating fatally. Both cases presented typical symptoms. Indeed I believe that there are few physicians of large experience who have not met with one or more cases.

Mild cases are often undoubtedly overlooked, while severe ones are sometimes mistaken for other conditions. This is not strange inasmuch as small infarctions may give rise to few or no symptoms, while the symptoms arising from large infarctions are often confusing, especially if suddenly fatal.

Pulmonary embolism is the result of the plugging of a pulmonary artery by an embolus, the consequence being an extravasation of blood into the pulmonary tissue. Embolic infarctions occur in the form of pyramids with the base usually upon

the pleura. They vary greatly in size although always retaining the same shape unless centrally located. The average size is about that of an egg, although they may be as small as a filbert or even smaller, or may be sufficiently large to involve a whole lobe of a lung. They are most frequently found in a lower lobe posteriorly. They may be single or multiple according to the number of emboli finding lodgment in the pulmonary vessels. They are dark colored, brown or black, and are airless and colorless. The emboli producing infarctions may be derived from the right side of the heart, the result of the sweeping away of the vegetations from an acute or chronic endocarditis, or they may be derived from the venous system as a result of a phlebitis, or from operations upon or injuries of veins, or they may be derived from a puerperal uterus. Our text books generally give as the most common cause of pulmonary embolism blood stasis associated with or resulting from acute or chronic disease of the heart, but the reported cases show by far the most common cause to be thrombi from the uterine sinuses during the puerperal state. Of the cases whose histories I have been able to collect, eleven occurred in the puerperal state, one during an attack of phlebitis, one following an operation for varicose veins, one following an operation for hemorrhoids, one following an injury to the subclavian vein, one from flushing a hematocele after an operation, and one as a result of a mitral stenosis associated with a uterine fibroma. If the emboli are septic or if they become infected with pus organisms by way of the air passages, necrosis, gangrene, or pulmonary abscess results.

The symptoms vary according to the size and location of the infarctions. If small and centrally located there may be no symptoms or signs by which we can diagnose the condition. If a large branch of the pulmonary artery is obstructed by a clot sudden death may occur with the symptoms of asphyxia, frantic efforts for breath, rapid, feeble and irregular heart action, unconsciousness and not infrequently convulsions. When the condition is not immediately fatal there is great restlessness and anxiety with a fear of impending death which is undoubtedly due to the dyspnoea. When the obstruction is in one of the smaller branches the leading symptoms are intense dyspnoea, rapid and shallow respiration, pain, rapid and thready pulse and bloody

expectoration—either pure blood or mucoid masses tinged with blood. The cough is frequent and painful.

The physical signs will depend upon the size and situation of the infarction. When centrally located many of the physical signs are absent or beyond our recognition and we must base our diagnosis upon the rapid and shallow respiration, painful cough and characteristic expectoration. When these symptoms are seen in a puerperal case, or in connection with a phlebitis or following operations upon the veins, we may be well assured of the diagnosis. If the infarction is near the pleural surface and of considerable size the physical signs are well marked and easily recognized. In addition to rapid and shallow respiration we will elicit dulness on percussion, increased fremitus on palpation and bronchial respiration on auscultation. We should distinguish between pulmonary embolism and pneumonia. In both cases the onset is sudden, but in pneumonia there is a chill followed by high fever, rapid bounding pulse and high temperature. Pulmonary embolism is rarely ushered in by a chill, and while there may be great dyspnoea the temperature is not high, and again the pulse instead of being full and bounding is rapid, feeble, thready and often irregular, accompanied by a cool, moist and clammy condition of the skin. The history of the case in pulmonary embolism will aid greatly in making the diagnosis, while the microscopical findings will make the diagnosis conclusive. In the expectoration of pneumonia we will find the diplococcus pneumoniae; in pulmonary embolism only leukocytes and red blood corpuscles.

The prognosis will depend largely upon the extent of the lesion. Large infarctions are apt to be suddenly fatal, while those resulting from septic thrombi or that become subsequently infected may lead to gangrene or abscess; consequently the prognosis should always be guarded. Of the thirty-five cases collected by Sperling twenty-seven were fatal, while of the eighteen I have been able to collect there were nine deaths.

I would here submit a report of collected cases:

Case 1. Bowen (O.), Liverpool Med. Chir. Journal, 1889, Vol. 9, pages 70-74. Sex, female. Age, 25. Date, July 2, 1887. Cause—Puerperal state; large embolus in pulmonary artery from a uterine sinous. Symptoms—Headache, nausea, palpitation;

pulse, 160; breathing quick; ghastly, anxious, thirst, limbs cold, lips pale. Treatment—Liq. ammonia fort., m. iv in iced water or milk every half hour. Eight days later hourly during the day and two hours at night. Result—Recovery. January 20, 1899, in excellent health.

Case 2. Rose (P.), Indian Med. Gazette, 1894, v. 29, pp. 258-259, Calcutta. Sex, female. Age, 25. Date, December 24, 1893. Cause—Puerperal state, varicose veins of both legs, coagulation in uterine sinuses, and had extended through illiac veins to inferior vena cava. Probably due to violent effort to rise in bed. Fibrinous clot lodged in small branch of pulmonary artery. Symptoms—Sudden headache and shortness of breath, great dyspnoea, extremities cold and bloodless, slight delirium, general anasarca; temperature, 105. Treatment—Morphia, one-quarter grain, every twelve hours, for four days, followed by hot flax-seed meal over abdomen. Result—Recovery. February 13, 1894.

Case 3. Fell (G. E.), Journal American Med. Association, 1891, v. 17, pp. 90-93. Sex, female. Date, March 3, 1891. Cause—Puerperal state. Symptoms—Dyspnoea, cyanosis, albuminuria, rapid heart action, quick respiration; pulse, 130-170; respiration, 50. Treatment—Oxygen gas; 1,200 gallons. Result—Recovery.

Case 4. Gray (A. J.), Daniels, Texas Med. Journal, 1887-1888, v. 3, pp. 130-132. Sex, female. Date, March 26, 1886. Cause—Puerperal state. Symptoms—Pain in right side, great weakness, deep palor, bloated face and extremities, anorexia, restless, anxious, breathing heavy, pulse 120, temperature normal, heart tumultuous, lips purple, pulse irregular. Treatment—Whiskey, ammonia carb., digitalis. Result—Died six hours after beginning of dyspnoea.

Case 5. Hebb, Westminster Hospital Reports, 1891, v. 7, pp. 71-76. Sex, female. Date, February 12, 1889. Cause—Hemorrhoidal operation. Symptoms—Dyspnoea; urgent; patient died in a few minutes.

Case 6. Hebb, Westminster Hospital Reports, 1891, v. 7, pp. 71-76. Sex, male. Age, 36. Date, August 20, 1891. Cause—Influenza. Symptoms—Bronchitis, dyspnoea, cough, limbs swollen, expectoration of blood, one side of face paralyzed, slight jaundice, pain in right chest and abdomen, heart sounds feeble,

pulse 116, respiration 40. Treatment—Not reported. Result—Death. Post mortem, hemorrhagic infarction much more intense in right than left lung; both right and left pulmonary arteries plugged with clots; main veins of both right and left lower extremities plugged with large clot.

Case. 7. Humphrey (Sir Geo.), Lancet, 1893, v. 2, p. 629. Sex, female. Age, 48. Date, November 14, 1892. Cause—Injury in subclavian vein. Symptoms—Not given. Treatment—Not reported. Result—Death occurred suddenly four days after injury; pulmonary arteries plugged with large clot.

Case 8. Glenn (J. H.), Trans. Royal Academy of Med., Ireland, 1896, v. 14, pp. 291-296. Sex, female. Date, December 9, 1895. Cause—Puerperal state; varicose veins of both legs. Symptoms—Became suddenly faint and breathless on the ninth day after confinement; heart tumultuous; pulse, 110-140; cyanosed; highly nervous; temperature, 101 to 103. Treatment—Digitalis, spts. ammonia aromat., spts. aetheris co., morphia, paraldehyde, sulphonal. Result—Recovery.

Case 9. Johnson (R.), Trans. Pathological Society, London, 1888-1889, v. 40, p. 45. Sex, female. Age, 54. Date, December, 1888. Cause—Phlebitis; varicose veins. Symptoms—Sudden pain in chest and dyspnoea. Treatment—Not given. Result—Death in nine and one-half hours. Post mortem, firm clot in pulmonary artery six to seven inches in length.

Case 10. Remfry (L.), Trans. Clinical Soc., London, 1891, v. 24, pp. 222-226. Sex, female. Age, 33. Date, July 17, 1889. Cause—Clot from a hematocele dislodged by douche. Symptoms—Douche at 8:30; at 8:40 seized with extreme dyspnoea; deep cyanosis, unconsciousness, pulseless, extremities cold, respiration ceased and patient apparently dead. Treatment—Artificial respiration for two and one-half hours; oxygen gas, ammonia carb., senega. Result—Recovery.

Case 11. Vogt (H.), Norsk. Mag. f. Lægevidensk, 1897, pp. 1130-1140. Sex, female. Age, 31. Date, August 30, 1896. Cause—Puerperal state. Symptoms—Dyspnoea, anxiety, death impending; pulse 160-170, later 96; respiration 36; temperature 37.4 to 38.4; anorexia. Treatment—Morphine suppositories. Result—Recovery.

Case 12. Vogt (H.), Norsk. Mag. f. Lægevidensk, 1897, pp. 1130-1140. Sex, female. Age, 26. Date, 1897. Cause—Puerperal state; secondary syphilis. Symptoms—Pulse 100, temperature 39.2; attack on twelfth day after labor; respiration short and irregular, cold sweat. Treatment—Hypodermic injections of naphtha; no relief. Result—Death in a few minutes. Post mortem, large clot in pulmonary arteries.

Case 13. Vogt (H.), Norsk. Mag. f. Lægevidensk, 1897, pp. 1130-1140. Sex, female. Age, 38. Date, 1897. Cause—Puerperal state. Symptoms—Dyspnoea; cyanosis. Treatment—Artificial respiration. Result—Death in ten minutes; no post mortem.

Case 14. Vogt (H.), Norsk. Mag. f. Lægevidensk, 1897, pp. 1130-1140. Sex, female. Date, 1863. Cause—Puerperal state. Symptoms—Pulmonary embolism eight days after confinement. Result—Died in a few minutes. Post mortem, three gangrenous lesions in lungs and embolus in left lung.

Case 15. Oeder, Berliner Klin. Wochenschrift, 1892, p. 411. Sex, female. Age, 44. Date, December, 1891. Cause—Mitral stenosis and uterine fibroma. Symptoms—Dyspnoëa, pain in right leg, unconsciousness; rapid, irregular respiration; cold sweat, extremities cold, lips and nails cyanotic, pulse rapid, expectoration of pure blood. Treatment—Subcutaneous injection of camphor oil, morphine, cardiac stimulants. Result—Recovery.

Case 16. Sperling (Max), Zeitschrift für Geburtshülfe and Gynaekologie, 1893, v. 27, pp. 239-265. Sex, female. Age, 25. Date, September 19, 1892. Cause—Puerperal state. Symptoms—Labor normal; attack came on suddenly three weeks later; headache, dyspnoea. Result—Death occurred in two or three minutes. Post mortem, emboli in right and left pulmonary arteries.

Case 17. Sperling (M.), Zeitschrift für Geburtshülfe and Gynaekologie, 1893, v. 27, pp. 239-265. Sex, female. Age, 18. Date, November 26, 1892. Cause—Puerperal state. Symptoms—Dyspnoea, anxiety, oedema, nephritis, bloody expectoration, labored breathing, pulse 130. Treatment—Three injections of camphor and three of ether in ten minutes, followed by two other ether injections. Result—Recovery by December 14, 1892.

Case 18. Waxham (F. E.). Sex, male. Age, 50. Date, October 9, 1899. Cause—Detachment of thrombus, following operation for varicose veins. Symptoms—Sudden dyspnoea; palpitation of heart; rapid, weak pulse; pallor; cool, moist condition of skin; cardiac murmur lasting a few hours, followed by pain in left lung; frequent, painful cough; rapid, shallow respiration; expectoration of pure blood, followed by mucoid masses tinged with blood. Treatment—Oxygen gas, ammonia carb., liquor ammoniae acetatis, strychnia and digitalis. Result—Recovery after three weeks' illness.

As illustrative of typical attacks of pulmonary embolism I desire to allude to a few cases in detail:

John H. Glenn cites the following case: The patient was delivered of second child December 9, 1895. Before and after marriage she suffered from varicose veins of both legs. On the third day the attention was called to the left leg, where the internal saphenous vein was found thickened and inflamed. The usual treatment was pursued. The limb was elevated, a lotion of lead and opium was applied covered with cotton wool and bandaging. The patient was progressing well. On the 18th day she had a visitor and probably over-exerted herself; she became suddenly faint and breathless and there was tumultuous beating of the heart. She was given digitalis and diffusible stimulants. At 11 p. m. on the 19th her temperature was 101 and pulse 140 and the respiration 40. There was marked cyanosis and she was highly nervous. A cardiac murmur was present, which lasted four days. With the disappearance of the murmur the temperature rose to 103.4, and a localized area of pneumonic consolidation appeared at the back of right lung corresponding with the middle lobe. At the same time there was rusty expectoration. Diagnosis, embolism. The treatment consisted in the administration of morphine to allay restlessness, which was extreme; digitalis, aromatic spts. ammonia and spts. aetheris co. The morphia was changed for paraldehyde and then to sulphonal, which proved the most serviceable. The author had twice before met with pulmonary embolism. February 20, 1896, the heart was normal, but there was still some dullness over lower portion of the right lung; this, however, disappeared and the patient made a perfect recovery.

In the discussion of this paper Dr. Parsons said that he had seen a post mortem on a woman in Vienna who had gotten up on the third day after confinement. A large embolus was found, completely obstructing the pulmonary vessels.

Dr. Tweed said that pulmonary embolism was a very rare affection.

Dr. Doyl had a patient who had several attacks of severe dyspnoea after confinement. She was treated with carbonate of ammonia and ether, from which she derived much benefit and finally made a good recovery.

Dr. Kidd had met with but one case of pulmonary embolism. It occurred a few hours after delivery and the patient died in spite of treatment by stimulants. (Royal Academy of Medicine, Ireland, 1896, v. 14, pp. 291-296.)

Leonard Remfrey reports the following instructive case: The patient entered St. George's hospital July 17, 1889, with an hematocele. It was opened per vaginam and a large clot evacuated. A large glass drainage tube was inserted and the cavity washed out with boro-glyceride solution, 3i to Oi. August 17 the patient was considered convalescent, but it was decided to give a last douche with the irrigator. At 8:30 the douche was given. At 8:40 it was discontinued, as the patient complained of severe pain over the sacrum; then without the least warning she was suddenly seized with extreme dyspnoea, the face became deeply cyanosed and the patient became unconscious. No pulse could be detected at the wrist, the extremities were cold, the cornea insensitive. The breathing ceased entirely at 9:15 and the patient to all appearances was dead. Artificial respiration was begun and continued for two and a half hours, until 11:45, when the respiration was rapid and shallow and of the Cheyne-Stokes variety. It soon became very feeble and artificial respiration was resumed again up to 2:15 p. m. Oxygen gas was given at 12:20 and this appeared to immediately turn the tide. Under this treatment the patient rapidly improved in color; the pulse now for the first time became perceptible at the wrist, though it could not be counted. The patient recovered consciousness at 4 p. m. The pulse then was 120, the respiration 50, and the lips were rather blue, together with considerable dyspnoea. At 5 p. m. the pulse was regular and 110, but very weak. The

patient had a very bad night, suffering from paroxysms of dyspnoea about every half hour, lasting ten minutes. The next day the attacks of dyspnoea were not so frequent, and the following day the cyanosis disappeared. The cough, however, still remained troublesome, for which senega and carbonate of ammonia were given. An examination of the chest in front revealed that the left side was expanded more than the right. All over both lungs were rhonchi without tubular breathing. The chief reasons for believing the case to have been one of pulmonary embolism were:

(1) The suddenness of the attack.

(2) Tumultuous breathing, followed by a few sighing inspirations, and finally cessation of respiration.

(3) The rapidly developing cyanosis, which disappeared gradually, but not entirely, for forty-eight hours.

(4) The occurrence subsequently of a localized pneumonia in a small area of the middle lobe of right lung.

(5) The inferior expansion of the right side of the chest as compared with the left.

(6) The occurrence of the attack after manipulation, which might easily have dislodged a clot.

A case coming under my own personal observation well illustrated the symptoms and nature of pulmonary embolism. October 9, 1899, I was called by one of our leading surgeons to see a patient upon whom he had operated a few days previously for varicose veins. The patient had violated the strict and explicit injunction to keep perfectly quiet, thinking it hardly necessary when he was doing so well. As a result a thrombus became detached from the seat of operation and entered the venous circulation. He was taken suddenly with palpitation and irregularity of the heart's action, dyspnoea, restlessness and great anxiety. The skin was cool and moist. Upon examination of the heart a well marked cardiac murmur was found. The palpitation, the irregularity of the heart, the rapid and feeble pulse, the dyspnoea and cardiac murmur all coming on suddenly, together with the history of the case, made it evident that a large blood clot was entangled in the tricuspid valve. In the course of a few hours, under the use of oxygen gas by inhalation, carbonate of ammonia in full doses, and strychnia hypodermically, the em-

bolus disappeared from the heart and the murmur, irregularity and palpitation subsided. With the disappearance of the embolus from the heart the symptoms became less urgent for a short time, but were quickly followed by severe pain in the lower lobe of the left lung, continued and severe dyspnoea, restlessness, rapid and shallow respiration and great anxiety. There was but little fever, the temperature not rising over 100, but the pulse was rapid, feeble and thready. The patient appeared almost as in collapse, the surface of the body being bathed in cool perspiration. For two or three days the characteristic expectoration of pure blood in small masses occurred, followed by mucoid expectoration tinged with blood. Under the use of morphia hypodermically to relieve the pain and restlessness, the continued use of oxygen, strychnia, ammonia and digitalis, recovery finally took place after an illness of three weeks.

The practical deduction that should be emphasized in the consideration of this subject is the importance of absolute rest and quiet in all cases of phlebitis, during the puerperal state, and especially after all operations upon veins.

REFERENCES.

Anders' Practice of Medicine.

Tyson, Practice of Medicine.

Wood and Fitz, Practice of Medicine.

Liverpool Medico-Chir. Journal, 1889, v. 9, pp. 70-74.

Indian Medical Gazette, 1894, v. 29, pp. 258-259.

Daniels, Texas Medical Journal, 1887, v. 3, pp. 130-132.

Westminster Hospital Reports, 1891, v. 7, pp. 71-76.

Lancet, 1893, v. 2, p. 629.

Trans. Royal Academy Med., Ireland, 1896, v. 14, pp. 291-296.

Trans. Clinical Society, London, 1891, v. 24, pp. 222-226.

Norsk. Mag. f. Lægevidensk, 1897, pp. 1130-1140.

Berliner Klin. Wochenschrift, 1892, p. 411.

Zeitschrift für Geburtshülfe and Gynaekologie, 1893, v. 27, pp. 239-265.

A. C. DeCoppins, Newberry Library Med. Dept.

DISCUSSION.

Dr. C. B. Van Zant: We are certainly indebted to Dr. Waxham for this comprehensive description of pulmonary embolism and for this clear illustrative case. With the reader of the paper, I had not supposed that the condition was so rare as his statistics indicate. As suggested, this fact may be accounted for on the supposition that some cases have been overlooked and that others have not presented physical signs distinct enough for diagnosis.

Pulmonary embolism is one of those diseases which interests every medical man. To the surgeon it appeals because of such cases as the one which Dr. Waxham has cited; but it is by no means limited to operations upon varicose veins, but may occur after many other operations. It interests the gynaecologist because of the fact (as has lately been shown by Gessner) that it is not a very rare sequence of pelvic operations. He finds it especially common after operations for fibromata and carcinomata. The general practitioner finds his interest in this disease in the fact that it so frequently follows thrombosis of the right heart cavities and of the peripheral veins. In these conditions we should be continually on the alert for its occurrence. In a recent case of typhoid, complicated with femoral phlebitis, sudden death, with indefinite physical signs in the lung, suggested pulmonary embolism as the cause. The obstretician is interested in pulmonary embolism because of its comparative frequency during the puerperium, as indicated by Dr. Waxham. Here it may originate from thrombi in the uterine sinuses, or, where phlegmasia is present, from the femoral vein. There is one form of pulmonary embolism which Dr. Waxham has not mentioned, namely, air embolism, a form which may be of gravest import. It has long been recognized by surgeons as one of the risks of operations in the so-called dangerous region about the neck and thorax. But as a result of careless injections into the uterus during the puerperium, it is a not inconsiderable risk. I well remember a case of this kind, occurring in my practice some years ago, where a nurse, contrary to instructions, gave an injection with an old Davidson syringe. Air was doubtless forced into the uterine sinuses,for in a few minutes the most profound collapse developed. The pulse became exceedingly rapid and

thready, the skin cold and clammy, and death seemed imminent. It was only after the most vigorous stimulation for several hours that the patient rallied and recovered. Such cases teach us the great danger of meddlesome midwifery.

THE RELATION OF STATE AND LOCAL BOARDS OF HEALTH TO OUTBREAKS OF DIPHTHERIA.

BY G. E. TYLER, M. D., DENVER, COLO.

The presence of one case of genuine diphtheria in a community is an occurrence of sufficient importance to demand the earnest attention of those responsible for the prevention of the unnecessary spread of disease. For a single mild case may mean many severe ones and the death of not a few individuals. If Pasteur's now famous aphorism, "It is in the power of man to cause all parasitic diseases to disappear from the world," be true, there is need of greater ability in applying our present knowledge concerning this one. As diphtheria is a disease for which there exists a positive method of diagnosis and a specific treatment, Pasteur's prophecy ought to have a fair testing in its management. It is my purpose to attempt to set forth the methods to be used by health officials in their battle with this disease.

There should, at all times and in all places, be offered competent bacteriologic facilities free of charge to every citizen. The absolute uncertainty of clinical phenomena for mild or atypical cases has been repeatedly proven. The throat may present but the faintest hyperaemia, yet the culture may be positive. In well-marked cases the clinical appearances are sufficiently distinct to warrant a positive diagnosis without the aid of a bacteriologist, but it cannot be too strongly emphasized that the greatest skill in clinical work is not sufficient to detect

mild cases of genuine diphtheria. Because of this fact no obstacle should be placed in the way of obtaining a prompt bacteriologic diagnosis. On the contrary, every facility should be offered the interested person, whether he be a physician or an anxious parent. Culture outfits in convenient form should be placed at accessible supply depots, each outfit being accompanied by plain printed instructions as to the method of use. In cities messengers should be provided to collect the outfits as soon as the cultures have been taken. Whenever requested an officer of the local board of health should be sent to take the culture. In small communities it is quite out of the question to maintain a bacteriologic laboratory. It then becomes the duty of the State Board of Health to supplement the work of the local board by furnishing the necessary facilities. To accomplish this, the State Board of Health must have a competent bacteriologist, not appointed for political reasons. It must also provide all incorporated towns which have no local laboratory with culture outfits, and there must be prompt communication between the supply depots and the laboratory. The culture outfits should be as compact as possible, in order that the cost of sending them may be reduced to the minimum. The former regulations of the postoffice department required a clumsy outfit which was poorly adapted to the work, and which required twelve cents postage every time it was mailed. Through the efforts of the Colorado State Board of Health, assisted by others interested, the regulations were so modified as to permit the use of a much smaller outfit. It was formerly the custom to treat these specimens as fourth-class mail, but the new order directs that they be treated as letter mail. This may mean a difference of twelve hours in the receipt of the specimen. Every State Board of Health should be granted sufficient funds to establish these supply depots. The State Board of Health of Colorado will have such depots established in every county on or before September 1, 1900. The service of the laboratory is free of charge to every citizen, and reports are made as promptly as possible. In every positive case immediate report will be made by telegraph. A like prompt report will be made in negative cases when requested. In sending specimens the name of the patient should be given, as well as that of the person sending the specimen.

Physicians should take cultures in every case which looks at all suspicious. Much tact is required to secure the active participation of some in this movement, but the wise health officer will so protect the interests of the profession that all, except the few who are by habit opposed to everything, will see the advantage to be gained by frequent use of the laboratory.

Free antitoxin should be provided for all infected individuals who cannot afford to buy it. The early use of antitoxin is of such extreme importance to the successful management of diphtheria that physicians should be given to understand that whenever they have a case which demands it, antitoxin sufficient for the patient can be had for the asking. As the State Board of Health has no funds for such purpose, local boards must supply this.

Every case of diphtheria should be reported to the health authorities and a record of it be made by them. Physicians outside the large cities of Colorado do not seem to know that the law requires immediate report of all cases of contagious disease, but they have usually been willing to make such reports when informed of the law. The State Board of Health furnishes blanks for such reports free of charge and is seeking to make complete and accurate record of all cases. The record made by the health authorities should show the exact location of the patient, the number and names of the rest of the family, and all others known to have been exposed. The local boards should make note of the milk, water and ice supply, and, if there are children in the family, the school and Sunday school should be recorded. The officers of such schools should have early notification of the existence of the disease, the public librarian should be notified in order to see whether any books are in the family, and care should be exercised to prevent the spread to other families by the milk supply. For the protection of the public, every house in which diphtheria is present should be distinctly placarded. Some have questioned the necessity of the placard, but every person visiting a house has a right to know before he enters whether he will encounter diphtheria by entering. If every infected house is placarded without favor to rich or poor, the community will appreciate the value and justice of the regula-

tion. The regular notification of public school and Sunday school officers does much to educate public sentiment. Furthermore, the record of such data often enables the intelligent health officer to trace the different cases to a common source.

The great value of keeping record of the milk supply has been demonstrated many times.

The question of quarantine is important. Who shall be quarantined and for how long? The patient must be quarantined until his throat is free from bacilli. This seldom occurs under three weeks, and because people grow restive under repeated positive reports, it is wise to fix the minimum period of quarantine at three weeks, and to take no secondary cultures during this time. The Colorado State Board of Health has adopted the following rule:

"In all cases where the bacteriologist reports the diph-
"theria bacilli present, the patient should be absolutely quaran-
"tined. A second culture should be taken twenty-one days after
"the first and forwarded for examination. Quarantine must be
"maintained until the bacteriologist reports the throat free from
"diphtheria bacilli. No children from the family should be
"allowed to attend school until two weeks after the throat is
"free from diphtheria bacilli."

The breadwinners need not be kept from their work, unless they be school teachers, or others who mingle much with children, but they should be cautioned to be little in the sick room, or else to be careful to change their clothing and bathe with antiseptics before leaving the house. Before a nurse employed in a diphtheria case goes to another patient a culture from her throat should be examined and her clothing should be disinfected. In fatal cases of diphtheria the funeral should be private and under the supervision of a health officer.

Those exposed should be given immunizing doses of antitoxin, and this should be repeated in two weeks, if exposure continues. With the present state of public opinion, it is not wise for health officers to insist upon immunization of the exposed, but they should do all in their power to encourage it. Some day the custom of immunization after exposure to diphtheria will be as common as vaccination after exposure to smallpox.

The state or local board of health should have circulars for public distribution, and one of these should be placed in the hands of the head of the family where the disease appears. The following is from a circular on this subject issued by the Colorado State Board of Health, it being identical with one previously issued by the Denver Bureau of Health:

"Diphtheria is a disease which manifests itself especially in "the throat. It is so dangerous and so difficult of identification "that every sore throat should be regarded as suspicious, and the "person suffering from it kept out of school until the throat has "been examined by a competent person and the nature of the "sickness determined. The State Board of Health determines "absolutely the existence or non-existence of diphtheria by a "bacteriologic examination of the secretion from the throat, and "this examination is made at the request of any citizen without "charge. Children from houses in which diphtheria has occurred "should not be allowed to resume school attendance until two "weeks after a bacteriologic examination has shown the throat "of the sick person to be free from diphtheria germs, as certified "by the health authorities."

Toys with which the sick child has played should be destroyed or soaked in a strong antiseptic. Books should be burned, and all articles which will stand it should be separately boiled. The necessity for thorough fumigation is apparent. For disinfection of the room the Colorado State Board of Health recommends five pounds of sulphur to each 1,000 cubic feet of space, with exposure for twelve hours; or formaldehyde sprinkling, using five ounces of the 40 per cent. solution for each 1,000 cubic feet of space. The objection to the former is its corrosive action, and to the latter its poor penetration.

The constant use of the bacteriologic test, the prompt application of the serum treatment, complete isolation of infected individuals, immunization of all exposed and thorough disinfection —these are the methods which, intelligently applied, will prove the truth of Pasteur's aphorism.

SCARLET FEVER AND QUARANTINE.

BY W. A. KICKLAND, B. S., M. D.

Few diseases show such erratic notions as to the choice of a victim as scarlet fever. Sometimes one child in a family will take the disease, while several others apparently just as susceptible will escape. Children may be with the disease for weeks without taking it and afterward be infected by a third person or the merest contact. Isolated cases arise with apparently the same conditions as have existed for months. A weak, sickly child may have the disease in its mildest form, while its robust brother may become infected and die in three days. So evident is this fact that up to twenty years ago the question of the disease being contagious at all was freely discussed. Meigs and Pepper (1874) describe the disease as arising either from contagion or from the epidemic influence. At present we believe that every case comes from some preëxisting one, and that in cases where the connection cannot be traced the fault is in our not knowing all the conditions.

The specific cause is not known, but is probably a microorganism. Several germs have been isolated in connection with the disease but none of them have yet satisfied all the requirements necessary to absolute proof. The diplococcus scarletinae discovered by Class and Wynekoop, and later investigated by Jaques[1], is said to have produced in hogs a disease resembling scarlet fever with the germs in the blood and scales.

The virus is given off in the discharge from the mucous membrane, in the scales of the epidermis, in the pus from suppurating foci, and probably in the perspiration, feces and urine. Of these, the most infectious are the mucous discharges, and the next the epidermal scales. The pus is at times infectious but apparently not always so. The urine, feces and perspiration are supposed to sometimes carry the contagion.

The duration of contagion in the patient varies within wide limits. In the majority of cases the danger of infection is over at the end of desquamation, providing there has been thorough

disinfection; this may be anywhere from twenty-one to sixty-five days. In mild cases desquamation may be complete at the end of the third week, sometimes earlier; while in severe forms with relapse there may be scaling at the end of the ninth week. Cases are on record in which the disease has been conveyed after much longer periods of time. Neech, in a paper read before the British Medical Association[2], records a case in which the disease was transmitted after 181 days. Unfortunately he does not state whether there was suppuration of the middle ear or other complications still existing. Johnston[2] gives instances of contagion after three months. H. C. Wood[3] reports a case of infection after forty-two days, and R. H. Mauss[4] gives two cases of transmission of the disease after six weeks, although in Mauss's case the children were brought back to the rooms in which the disease occurred, so there might be a question of thoroughness of disinfection. Line[5] records a case transmitting the disease after fourteen weeks. Cases with purulent nasal or pharyngeal discharge and cases with nephritis following are particularly dangerous. Holt[5] gives a case of purulent nasal discharge which communicated the disease after eleven weeks.

Infection may take place from suppurating cervical glands. Gates and King[6] each reports the beginning of an epidemic from this source.

Ashby[7] tells of an epidemic arising in the hospital from opening an empyema following scarlet fever. He also says that from two to four per cent. of the cases released from the hospital afterward conveyed the disease.

The virus is of extreme vitality and is given off in almost unlimited amounts. Sometimes, after apparently the most thorough disinfection and often where the process of cleansing has been indifferently carried out, the disease has been contracted from rooms and clothing used by scarlet fever patients, and this after long periods of time. Watson[8] and Brook[9] each report a case of contagion after one year. Numerous cases are reported after three to five years, and Wessinger[6] reports a case of contagion after six years. Holland[10] gives an instance of a boy taking the disease from wearing a pair of made-over trousers which had been packed away for thirty-five years, their former owner having died at that time from scarlet fever. The infection is

often carried by a third person. Physicians and nurses are especially liable to carry it. Osler[11] writes that he himself has carried the disease in one instance. Cats and dogs have been known to carry the infection. Books, toys, articles of clothing, and letters from infected houses have carried the disease long distances. The origin of many isolated cases may often be accounted for in this manner. A common and dangerous source of infection is from mild or unrecognized cases, or those who, in order to evade quarantine, refrain from seeing a physician. Unfortunately there are yet a few doctors who can distinguish between scarlet rash and scarlet fever, and patients having the former are allowed to scatter the contagion.

Can there be a fixed time of quarantine? If not, how short a time is it safe to establish as a minimum? In general terms it is safe to allow the patient to mingle with his fellows (after a thorough cleansing) as soon as desquamation is complete, provided there be no complications. Gibson[12] says that he repeatedly allows children to mingle with others at the end of the third week, after giving three or four hot water baths with carbolic acid soap, desquamation in some of the cases afterward going on and none of them conveying the disease. In the city of Detroit the minimum time is twenty-eight days. In Denver and most Colorado towns it is six weeks. If any cases are safe at the end of three or four weeks—and the majority of cases are through desquamating by that time—a longer period of quarantine works an injustice to the unfortunate sufferer. Not only this, but mild cases will not employ a physician nor report to the health authorities. They seclude themselves during the eruption and pursue their ordinary avocation during desquamation, scattering the disease broadcast. Six weeks' detention from work for a sore throat and a slight eruption to a wage earner sometimes means hunger and hardship which makes him rebellious. If he can assist his friend or neighbor in escaping this injustice, he is ready to do so by advice or secrecy.

Sometimes a part of the family is kept away from the sick one and allowed to mingle with the public, but except among the more intelligent and honest this is unsafe. Much better would be a complete quarantine for three or four weeks than a nominal one for six or eight weeks. A thoroughly competent

health officer by inspecting each case can, with safety, allow some to have their liberty at the end of four weeks, while those cases with a nephritis or purulent discharge can be kept until the dangerous period is past. This would remove the appearance of an arbitrary ruling and much less opposition would be encountered from the public.

In view of the foregoing, it would seem advisable that

1. Cases should be released from quarantine whenever desquamation is complete, provided there be no complications. This is usually from the third to the sixth week. All cases should be kept in quarantine as long as there is a purulent nasal or pharyngeal discharge. All cases of nephritis and all cases of purulent otitis or suppurating cervical glands should be kept in quarantine. The urine of those cases released before the end of the sixth wek should be frequently examined, as nephritis has been known to appear as late as the thirty-fifth day.

2. All children before release from quarantine should be anointed in the evening with a mixture composed of carbolic acid, 2; ol eucalypt, 5; olive oil, 100, followed in the morning with a thorough soap and water bath; this should be repeated four successive days. On the third day, clean, sterilized clothing should be put on and again on the fourth day. A most thorough disinfection should be made of the room and all clothing and utensils used about the patient. This should be under the immediate supervision of the health officer or his trained assistant. All articles which are not valuable should be burned or boiled, and all articles which are too valuable to be thoroughly disinfected should have been removed from the sick room at the beginning of the disease. It is the writer's practice to disinfect the rooms by burning sulphur with an excess of water vapor, three pounds to every 1,000 cubic feet, after all the articles have been arranged so that the fumes can easily penetrate. The rooms are kept closed for twenty-four hours, then opened, aired, and sheets dipped in formalin (Schering's 40 per cent. formaldehyde), one pound for each 1,000 cubic feet, are hung in the rooms, which are again closed for twenty-four hours. Too much pains cannot be taken with this procedure, for it is after the visible signs have disappeared that the germs of contagion are apt to bring back the disease to the unprotected.

3. No domestic animals should be allowed in the house during the infective period. All utensils used in the sick room should be placed in boiling water or in a solution of bichloride, 1 to 1,000, immediately after using. All clothing used about the patient should be placed in water before leaving the room and afterwards boiled or burned. The discharges from the bowels should be received in carbolic acid solution, 1 to 20, and the urine should be rendered aseptic by the addition of bichloride tablets in sufficient quantity to make the solution 1 to 1,000.

4. No one should be allowed to visit the house except those in authority. The physician and others who must of necessity visit the patient should be protected by wearing a cap and a loose-fitting gown large enough to cover all the clothing and which has been dipped in a solution of Hg Cl. 1 to 500, and allowed to dry. This should be slightly moistened again before wearing. The suit described by Dr. Hawes before the association last year answers the purpose admirably but is less convenient and no more safe than the gown. Overshoes or a separate pair of shoes should be worn while in the sick room. On leaving, the hands, face, and beard should be washed in a reliable antiseptic solution. It is well to have extra thermometers, stethoscopes, etc., and leave them at the house or carry them in a separate package so that they may be thoroughly cleansed before coming in contact with others.

5. There should be some means of justly compensating the quarantined family for the time lost. The public shuts them up for its own protection, not theirs. The public should be willing to pay for it, at least in a measure.

6. There should be appointed in each city and county a competent health officer, whose compensation is sufficient to justify him in giving enough time to the work to do it well. He should hold office during good behavior and his position should not depend on the caprice of the politician. He should visit every case of scarlet fever and raise the quarantine whenever he considers it safe to do so, whether it be at the end of the third or the tenth week.

BIBLIOGRAPHY.

[1]Jaques: Bulletin Northwestern University Medical School, March 31, 1900.
[2]Journal American Medical Association, September, 1897.
[3]Ther. Gazette, November, 1889.
[4]Ther. Gazette, November, 1890.
[5]Holt: Diseases of Infancy and Childhood.
[6]Report of State Board of Health, Michigan, 1891.
[7]Archives of Pedriatics, 1885.
[8]Practice of Physic, 1874.
[9]Journal of American Medical Association, October, 1888.
[10]Times and Register, March 12, 1892.
[11]Practice of Medicine.
[12]Practitioner, July, 1894.

THE CONSERVATIVE TREATMENT OF APPENDICITIS.

BY H. B. WHITNEY, M. D., DENVER, COLO.

One cannot have followed carefully the recent literature of appendicitis without having perceived a distinct abatement of the operative furor of the past decennum. It has seemed to the writer that in this society also the time may have come for the expression of greater conservatism. I shall first ask your attention to the question of operative interference in appendicitis, and then to that of its medical management.

It is impossible to approach candidly the still burning question of when to operate in appendicitis without some knowledge of its mortality. If I believed, as Deaver does, that only "a few cases will recover from this disease (16 in 400, according to Ribbert)," I should feel not only with Deaver that every case ought to be operated as soon as recognized, but that every individual ought to get rid of his appendix at the earliest possible moment. Such statements as this tend only to embitter what should be courteous and friendly discussion. When the general

practitioner is told by Beck that the mortality in expectantly treated cases of appendicitis is about 30 per cent., or by Gay that it is 50 per cent., he wholly distrusts conclusions which are based on any such assumption. He knows from his own experience that the premises are false. The unparalleled divergence of opinion between what is usually a medical camp on the one hand and a surgical on the other, is emphatically not due to a sort of moral cowardice or dread of the knife on the part of the average physician. Witness the readiness with which a host of abdominal and visceral affections have been given over almost bodily into the hands of the surgeon. This difference of opinion is wholly the result of contact with a different class of cases.

Let us glance at a few statistics. They are practically all that I have been able to find; none have ever been adduced by those who contend that the mortality of appendicitis is naturally large. Out of the ante-operative period Fürbringer had 120 cases with 12 deaths, a mortality of 10 per cent. Curschmann reports 453 cases, of which 9 were referred to the surgeon; of the remaining 444, 20 died, a mortality of 4.5 per cent. Nothnagel reports 120 cases; 9 were treated surgically and of the other 111, 4 died, a mortality of less than 4 per cent. Guttmann had 4 deaths among his own 100 cases. Renvers found in the Prussian army reports 2,000 cases noted with a mortality of 4 per cent. Of 54 cases from the Charite Hospital reports, 3, or about 6 per cent. died. Sahli, by collective investigation, gathered 7,213 cases from practising physicians; of these, 6,740 were not operated, with a mortality of 591, or 8.8 per cent. More recent statistics of cases treated expectantly are few because of more frequent operations. We find, however, in the Medical Record for 1896, a report by McCartney of 24 consecutive cases treated medicinally without a death. Lange, in the Medico-Surgical Reporter for 1895, reports 20 consecutive cases treated only with opium and calomel; all recovered.

My own small experience has been of the same general character. Of 14 cases quite recently observed, one was a fulminating perforate peritonitis which I saw in thirty minutes from its onset, and again in half an hour with Dr. C. A. Powers. It was decided not to operate, and death occurred on the fifth day. A

second mild case seen in consultation was operated with my consent, and recovered. I am quite confident it would have done so anyway. A third case was operated on the eighth day and died within thirty-six hours; nothing was found which would have precluded recovery had he been let alone. The other ten cases all recovered under medicinal treatment and I know of no instance of recurrence.

If the foregoing statistics are reliable, between 90 and 95 per cent. of all cases of appendicitis will temporarily recover without operation. Is there any good reason why these statistics should be distrusted? They certainly agree remarkably among themselves. They are neither small nor exceptional, and the eminent names attached to many of them are a sufficient guarantee that they were conscientiously collected. It is idle to contend that we are dealing with a different disease, or that diagnosis has grown more perfect. Perityphlitis and appendicitis are acknowledged to be identical in 98 per cent. of all cases, and we cannot question the diagnostic acumen of such men as Guttmann and Nothnagel. In one respect only is criticism admissible: Cases of fulminant peritonitis, like the one mentioned in my own series where the very first symptoms were those of perforation, were probably less frequently classed as appendicitis in former times than at present. But these cases are relatively rare, and could have had but little influence upon the statistical result.

If we accept these statistics as to the natural course of appendicitis, it seems proper to ask, How much has the mortality of appendicitis been diminished by operative interference? The margin of possible improvement is not great; it is represented by at most 10 per cent., which, of course, includes those fulminant cases beginning with a perforation, and with which even surgery can but ineffectually deal.

Unfortunately, the great body of operative statistics is unavailable in answering this question. It is very rare that any one surgeon has the opportunity to handle from the start any long series of cases as they come in general practice. Again, lists are apt to be vitiated by the inclusion of interval operations, the mortality of which is extremely small. Thus, we find Johnson, of Hartford, reporting a series of 100 operations with only

2 deaths; while Richardson, of Boston, lost 94 in a total of 464 acute cases, of which 284 were operated. It would be manifestly unjust to compare these two series, either with a series of unoperated cases or with each other. On the one hand the series of Richardson represents cases selected because of their severity —undoubtedly the worst in a very large community; while that of Johnson includes many mild cases and interval operations.

What we should like—a wish not likely to be soon gratified—would be: 1. A long series operated indiscriminately, that is, as they come to the general practicioner, as soon as recognized. 2. A similar series operated at any moment upon the development of serious symptoms. 3. A series in which, as advised by Ewald, the only indication for operation should be general peritonitis or abscess. 4. A series similar to the last except that, under favorable surroundings, a limited number of exceptionally severe cases should be operated in the first twenty-four hours.

As I have said, there are at present almost no uniform statistics which will aid us greatly in reaching a conclusion as to the reduction of mortality under operative interference. How, then, shall the general practicioner decide as to the proper course to pursue in appendicitis? We are told by our surgical brethren to beware of opium, our former sheet anchor. They advise us to do little but watch, and, wholly unselfishly, I am sure, to let them watch us. One would operate in twenty-four hours, if no improvement; another in forty-eight; another in seventy-two. One operates if the pulse reaches 120; another if the temperature remains for over three days at a certain height. One lays especial stress upon the pulse, another on tympany, another on vomiting, another on his general impressions. As many men, so many minds. This is not to the discredit of the surgeon. It is simply because no one has yet discovered the signs which portend a general peritonitis. In one case the most threatening appearances smooth out, and in another, fortunately rare, the fatal perforation comes unawares. As to the proper moment for operation, the surgeon, in the nature of things, can aid us little more than do his statistics.

It seems to me clear that the treatment of appendicitis must still be along certain general lines, followed in the light of its

natural mortality. It is unquestionably logical, and would, perhaps, under certain conditions, reduce the mortality to a minimum to insist that every case should be operated as soon as recognized. But aside from other and enormous objections to this course as a routine method, there is the all-sufficient one that patients refuse. They do not regard the operation itself and the expense and other attendant circumstances as trivial. To most of us there seem to be sufficient grounds for such objection. How many here would be operated to-morrow for the development of a little fever and local tenderness? Certainly few who really believe that even without interference their chances of recovery will be ten to one.

But there are, I imagine, few extremists in Colorado. Most of us try to individualize—we keep a vigilant watch and as soon as things begin to look serious we contemplate or consent to operation. Are we not sometimes too hasty? Is it not possible that too many operations are done during the first week? It is chiefly for the purpose of asking this question that this paper has been presented.

If it were adopted as a general principle that except for general peritonitis any operative interference after the first twenty-four hours should be postponed, if possible, until the end of the first week, I firmly believe that the mortality of appendicitis would be less than it is at the present time. Instead of saying with some, "When in doubt operate," I would say, when in doubt on the third, fourth or fifth day, wait! The reasons which may be adduced in support of this principle are both pathological and clinical, and they have the weight of much authority. It seems probable that in many cases of appendicitis the very first symptoms are caused by the development of a local peritonitis. This is nature's barrier—inflammation, exudation, adhesion. To disturb this process at a time when it is still incomplete, and when the focus of infection has already done about as much mischief as it can do, would even theoretically seem both hazardous and unnecessary. From the practical side listen to the words of Richardson after his operative experience of 284 cases. I quote several paragraphs, some of them indicating also what seems to be his increasing reluctance to interfere at an early period. He says: "There is no more difficult operation

in surgery than that of removing the appendix at this stage (third to fifth day) without infecting the general peritoneal cavity." Again: "In several of the fatal cases a localized infection was made general by direct contamination in spite of all efforts to prevent this accident." And again: "In view of the cases of similar severity and similar local signs which have recovered without operation, it seems to us clear that the question of interfering on the third or fourth day should receive most careful consideration. Cases of localized abscess of a week or more duration practically all recovered under simple drainage."

Roux of Lausanne, after an operative experience of over 500 cases, states that he usually waits for the formation of abscess. Dunn has observed 152 cases of which 52 were operated with 4 deaths; he advises either very early or very late operation, on perhaps the tenth or twelfth day. Ewald, one of the greatest German authorities on gastro-intestinal affections, writing in the Twentieth Century Practice of Medicine on appendicitis, gives but two indications for interference in acute cases—acute general peritonitis, and the signs of the formation of abscess. He states that he has followed this course for many years, and has never had reason to regret it. The statistics of Rotter of Berlin are among the most valuable we possess as representing a uniform material of considerable size treated on a conservative plan. In 213 consecutive hospital cases, 19 died—a total mortality of 8.9 per cent. Of these 213 cases, however, 21 were received with all the signs of general peritonitis; all were operated, with 7 recoveries. Of the remaining 192 cases, 156 recovered without operation—82 per cent.; 33 were operated with 2 deaths and 3 died without operation—a mortality of only 2.5 per cent. in 192 cases where the infection was localized about the appendix. Of 156 of these cases, which entered before the third day and in which an accurate history could be obtained, in none did the necessity for operation become apparent before the sixth day. The indications followed by Rotter are the same as those of Ewald—general peritonitis and abscess. For a hospital series, which certainly represents in general a more severe class of cases than those of general practice, a mortality of 2.5 per cent. is surely an eloquent plea for conservatism.

The non-operative treatment of appendicitis becomes of great interest to those who, like the writer, believe that not more than

from 10 to 20 per cent. of all cases demand interference. Leaving for the moment the question of diet and other measures which will presently be referred to, there are amongst us, in America especially, two distinct schools of therapeutists. The one insists that the bowels be kept open from the first, chiefly by the use of salts; the other would subdue all peristaltic movement by the free use of opium. Let us briefly compare these two conflicting methods of treatment.

The defenders of the cathartic plan claim in the first place that free evacuation is generally followed by immediate improvement; an argument which can have but little weight with those who believe that the great majority of cases will improve under any treatment in the course of the second or third day. It is further presumed that by watery stools a sort of peritoneal drainage is brought about, as was first suggested, I think, by Tait in certain forms of septic general peritonitis. In the same way others speak of depletion, on the hypothesis that the violence of the local process is subdued by unloading the vessels. But, on the one hand there is in a localized peritonitis but little danger of general sepsis as in the cases of Tait; and the theory of local depletion appeals but slightly to one who considers that a local inflammatory reaction is eminently desirable; not that we like to see it—any more than we do a hypertrophied heart; but it can scarcely be doubted that its effect is salutary. Other claims for cathartics are still less convincing than either of the preceding. Allow me to quote from Deaver. He states that he uses them: "1. To relieve pain by clearing the digestive tract of all irritating materials." It might reasonably be averred that the material whose natural habitat is this canal is not usually either irritating or painful. What does it irritate, and how, fluid as it usually is, does it cause pain? 2. (Quoting still further) "To diminish the virulence of the attack," on the supposition that the virulence of the cocci may be increased by a contiguous culture medium. This hypothesis is certainly thinkable—more for it can hardly be said. 3. "To set up active peristalisis in the intestine *and appendix*, and so help the latter to empty itself." One can scarcely read this without a shudder. Active peristalisis in a gangrenous or perforated appendix! It may well be asked in which direction it will empty itself—into the cecum or into the

peritoneal cavity? And right here we cease to theorize. Let me quote again from Richardson. He says: "It seems clear now, however, that the virulence of the infection is very largely dependent upon the size of the hole * * * and the liquidity of the cecal contents." Further: "A majority of the fatal cases of appendicitis have been attended by extensive fecal extravasations." He states that during operation he has observed liquid feces coming through a large perforation into the peritoneal cavity. The bare possibility that active catharsis may directly result in premature rupture of an appendix, or in fecal extravasation, seems to me to outweigh a thousand theoretical considerations like those which have been mentioned. By what reasoning can it be maintained that this result of saline catharsis is not merely possible, but probable—aye, even inevitable in certain cases? And when to this is added what can hardly be other than the deleterious effect of increased peristalisis on the formation and preservation of adhesions—that conservative process of localization which of all others we should be most eager to encourage, it is hard to understand how the free use of cathartics in appendicitis has received the sanction of so many members of the profession.

There are, however, many voices which are being raised against it. Mentioning only the names of Osler, Ewald, Nothnagel, Beck, Barling and Roswell Park, I will again venture to quote a few words of Richardson: "In the first forty-eight hours of appendicitis I look upon the administration of salines as extremely dangerous, and a not infrequent cause of general peritonitis and death."

Now, in regard to opium. Has not the general practitioner been a little too ready—even against his better judgment and the lessons of experience—to bow in dumb reverence before the surgical dictum, No opium! If fifteen years ago any American physician or surgeon had been asked to name a half dozen examples of specific medication, his list would probably have included the use of opium in peritonitis. From the time of its introduction in the early forties by Dr. Alonzo Clark, this method rapidly became universal, and was soon accepted by every known clinician upon the face of the earth. If this was all a mistake, or if to-day the practice still needs defense, it is a sad com-

mentary upon the value of observation and the progress of medicine. It would indeed be difficult to find a drug in the whole pharmacopoeia for which more can be said in relation to any one disease than for opium in intestinal perforation. In theory it precisely meets the paramount indication; it checks normal secretion and peristalsis at a time when, as we have seen, these threaten to become disastrous. At the same time it favors the agglutination of adjacent coils. That it also diminishes pain and general shock will hardly be considered an objection, either by the patient or medical attendant. In practice, too, its theoretical value has been abundantly confirmed. Aside from its universal adoption and the personal experience of every practitioner, it has the not unimpeachable and yet very suggestive sanction of statistics. The astonishing results of the ante-operative period, like those of Guttmann, Curschmann and others already quoted, were obtained under opium. It was used by McCartney and Lange in their series of twenty-four and twenty cases without operation and without a death. Richardson regards it as the only rational drug. Carl Beck, a fervent believer in early operation, says: "After the diagnosis is made the administration of opium is rational even if the operation is performed immediately afterward." Nothnagel in his well-known Specielle Pathologie and Therapie regards its use as of prime importance. Ewald in the Twentieth Century gives it the first rank. Finally permit me to quote two sentences from Osler: "I would protest most earnestly against the indiscriminate use of saline purges which have been advocated under a total misapprehension." "The medical treatment of appendicitis can be expressed in three words: Rest, opium, and enemata."

I have thus tried to indicate briefly that the opium treatment of appendicitis is fully sanctioned by history, by theory, by experience, and by the weight of recent authority. Against it is the fear of the surgeon that it will obscure dangerous symptoms and render the patient unduly optimistic. Against the latter objection it is useless to waste words; at the present time most individuals are fully acquainted with the dangers of appendicitis, and are prepared for the frequent necessity of operation. The first objection has greater weight. Opium given to a considerable degree of narcosis may unquestionably obscure the prom-

inent outlines of the disease. But it is not proposed to thus employ it. It should be given in moderate doses—neither to the production of narcosis, nor yet stingily, as if the eye of the surgical faculty were at the keyhole. Pain should be wholly relieved, and the bowels, after perhaps a preliminary enema, locked up for several days. Used in moderation, I do not believe that opium need have any serious effect in obliterating the signs of danger. It will affect materially neither pulse nor temperature; it will not lessen the tumor; it will not obscure the facies; it will neither prevent collapse nor will it simulate the board-like hardness and immobility of a general peritonitis. It may well be asked what we have gained by ostracising a drug of such great value for the sole purpose of giving a slightly greater clearness to the prognostic horizon; what has been given us in its place? Must not the answer be, No certainty as to the necessary precursors of danger, no unanimity as to the proper time for interference and, in both operated and unoperated cases, a large mortality? Is it not possible that this may be due in part to the abandonment of opium?

Other details of treatment, important as some of them are, can be but hurriedly considered. It is needless to do more than mention the necessity for absolute rest of both mind and body. A high enema may be given at the onset of a mild or moderate case; in a few very severe cases it is probable that even this would best be omitted. The ice-bag locally, or in many cases hot applications, will add to the patient's comfort. Stimulants, especially strychnia, will often be of service. The most important question outside of opium relates to diet. It is evident that it should be such as to leave the least possible residue. I believe that the plan of Sahli to give nothing by the mouth, not even water, during the first few days, is rational; he feeds meanwhile by the rectum. Certainly in any severe case, as Nothnagel says, rectal feeding alone would be the safest plan, with the administration of water in only teaspoonful doses. In milder cases, or later during convalescence, there could be no more suitable food than some one of the various broths with somatose, or possibly wine whey. Plain milk flavors flatulence and peristalsis. I am inclined to think that we pay too little attention to ingesta during the first few days of appendicitis.

In conclusion, were I to formulate briefly the course of action which I believe the general practitioner should pursue in appendicitis, it would be somewhat as follows: Any case with exceedingly stormy onset, or especially if there is any suspicion of general peritonitis, should be recommended for immediate operation as soon as the diagnosis is made. In all other cases opium should be freely used from the start; as, for example, following the plan of Sahli, ten or fifteen drops of laudanum every hour, reducing the dose as soon as pain is relieved. All purgatives should be avoided, and the diet strictly limited during the first few days. Upon the development of disquieting symptoms counsel, preferably surgical, should at once be requested. It is, however, desirable to postpone operation, if possible, into the second week on the ground that at least 80 per cent. of the cases not operated at the start will at this time be out of danger, while a number more will then be able to safely undergo an operation for abscess. Of the remainder some must necessarily be lost; but it may be hoped to rescue the majority by the occasional recommendation of earlier operation—now for acute general peritonitis, again for a recrudescence after temporary improvement, and again for the persistence on the fifth or sixth day, of the signs of a severe infection. For those who suffer from recurrent attacks the interval operation, of which the mortality is practically nil, should be most earnestly advised.

Many will no doubt consider this paper a retrograde step in the direction of antiquity. Some may even affirm that they detect about it an odor of the study rather than of the bedside; it is indeed to be regretted that we have not all had the experience of a Curschmann or a Richardson. But while the field of the general practitioner is necessarily small, his evidence is of such a sort that it cannot well be excluded from any hearing on appendicitis. It is only under the encouragement of this thought that I have ventured to present my personal impressions to this society.

APPENDICITIS: WHEN TO OPERATE.

BY I. B. PERKINS, M. D., DENVER, COLO.

In the last few years many heated discussions have taken place with reference to the time to operate in appendicitis. Some have taken the stand that all cases should be operated as soon as a diagnosis can be made. Others claim that all cases should be treated on the expectant plan, and only such cases be operated as show by their severity that they would certainly not recover without operation. There is still a third class, though small, who have been so *conservative* (if such can be called conservatism) as to oppose any surgical interference whatever, claiming that a greater proportion of cases will recover without the assistance of the surgeon than with it. Some have gone so far to this extreme as to state that 95 per cent. of all cases will recover without any treatment. This statement any observing man of experience knows to be false.

First, in considering the subject, I wish to exclude appendix colic, also catarrhal appendicitis. These affections exist, and are usually readily diagnosed, and while at the time of the first visit to a given case the physician may not be able to make a positive diagnosis, he will certainly be able to do so within twelve or sixteen hours. If the symptoms continue beyond twenty-four hours without improvement, it is almost positive that the case is one of acute infective appendicitis. Consequently what I may say in this paper will have reference to the latter affection only, as the first two need very little treatment of any kind.

Is appendicitis a medical or is it a surgical disease?

If all cases should be treated medically, what would be the mortality?

If all cases should be treated surgically, what would be the mortality?

I do not believe that a single member of this society will doubt that statistical answers to these questions would place appendicitis, as a disease, in the hands of the surgeon, just as

surely as would carcinoma of the uterus fall into the domain of surgery should the same questions be put in reference to that disease. If, then, appendicitis is a surgical disease, let us consider it as such, and, if surgical treatment in *all* cases will give a lower mortality than medical treatment in *all* cases, then it must be classed as a surgical disease. And if a surgical disease at all, it is one from the beginning, and the surgeon should be allowed to select the time when surgical measures will be of most value. Take, for example, a fracture of any bone, say the tibia; in a given number of cases of fractured tibia there would be a few reasonably fair limbs as a result of simply putting the patient to bed without any splints or dressings whatever being placed on the limb; or fractured tibia might be treated medically by liniments, poultices, blisters, cathartics, anodynes, etc., for a week or two without regard to the pathology in the case, and then a surgeon being called in could, by radical measures, get some very good results. But on account of these few recoveries, no rational man would for a moment contend that a fractured tibia did not properly belong to the domain of surgery. A like position should be taken in reference to appendicitis.

McBurney, in Warren & Gould's Surgery, published in 1899, page 406, says: "The number of practitioners who regard appendicitis as a medical disease is rapidly diminishing, and even those who claim that some attacks of appendicitis yield to medical means are entirely unable to select in the early stages of the disease the case which they have confidence in treating by internal remedies.

"No medical treatment of proved value for appendicitis has ever been presented to the profession, and the pathology of this disease renders it extremely unlikely that any such treatment will ever be discovered."

What is the pathology in appendicitis?

This differs widely in the different stages of the disease. In the first stage we have present inflammation of the mucous and sub-mucous structures; in the second, inflammation of the muscular tissues of the appendix; in the third, inflammation of the peritoneum covering the appendix; and in the fourth, the inflammation attacks whatever tissues are in relation with the

appendix, causing the formation of an intra-peritoneal abscess or the infection of the general peritoneal cavity. The changes enumerated in the first three of these divisions usually take place within the first 24 to 48 hours of the attack.

Beyond this time the fourth stage is beginning, unless the case be a very mild one. Not infrequently is a case encountered where sloughing of the appendix with general peritoneal infection occurs within forty-eight hours. If, then, within the first twenty-four to forty-eight hours the disease is confined to the appendix itself, why delay operation? Why not remove it at a time when there is no danger of infecting the peritoneal cavity, and when the abdominal incision can be closed without drainage, thereby removing any likelihood of subsequent hernia? Operation at this time would save practically all uncomplicated cases. I do not remember ever having known of a death in a case operated within forty-eight hours. Often a case is more than twenty-four hours old when the physician is first called, but care in eliciting the history in such cases will usually lead to a correct diagnosis being made at the time of the first visit.

Should we operate cases that are advanced beyond this stage when the surgeon is first called, or should we wait for these cases to form a walled-off abscess and become adherent to the anterior abdominal wall before attempting to relieve the condition?

While the mortality in this class of cases is much greater than when operation is performed in the earlier stages, yet I believe, in the hands of a competent surgeon and with the proper facilities for operation, that even at this stage the patient has a far better chance for his life in the operation than he has if the waiting plan is adopted.

I have seen several cases, some of my own and some of my colleagues, in which the abscess broke into the general abdominal cavity and death ensued while we were waiting for a more favorable time to operate.

In this class of cases the surgeon cannot help having a feeling of regret that he did not get the case a little sooner, but I believe, nevertheless, that he is doing his duty and giving his patient the best chance for his life, as well as a shorter period

of invalidism and a more perfect cure, if he operates. In these cases the appendix can usually be removed and future attacks thereby prevented. Also the harmful and sometimes disastrous effects of extensive adhesions are not likely to follow in this operation to anything like the same extent as is the case where a large abscess is allowed to form. In this latter condition the appendix can seldom be removed with safety, other attacks are liable to occur and the adhesions are usually extensive.

Should recurrent or chronic cases be operated?

When for any reason a given case was not operated at the time of the attack, there are liable to be future attacks. If the patient has had one or more recurrent attacks, or suffers any great amount of inconvenience from one attack, or if he resides in some place where he cannot on short notice get good surgical attention, the wisest plan by far is to operate in the interval between attacks.

Operation at this time is not a difficult matter and is almost free from danger.

Should cases be operated when intra-peritoneal rupture has occurred and general peritonitis exists?

To be placed in this position is indeed very trying to the surgeon and the chances of saving life are almost nil, yet every surgeon can call to mind cases that have been saved. It is true that operation in this class of cases does, in a measure, tend to cause the laity and the more timid of the profession to delay operation in other cases. However, I consider the action cowardly on the part of the surgeon if he refuses to give the patient the only possible chance for his life. Following I will give what a few of the leading surgeons and physicians of the country have said on this subject:

Dr. Steele in Matthews Medical Quarterly, April, '95, says: "Mortality is less than 8 per cent. during the first week and over 17 per cent. during the second week in operated cases."

Dr. DeCosta in Medical News, May 26, '94, says: "A large number of catarrhal cases are cured by medical treatment, but when the disease advances to pus formation surgical treatment is needed. If we err, let it be on the side of too early, rather than on that of too long delayed operation."

Dr. J. B. Murphy in American Medico-surgical Bulletin, October 10, '96, says: "By medical treatment we have a mortality of 10 per cent., and if we have 3 per cent. by the knife, then we must operate to save the other 7 per cent." In Medical News, January 5, '95, he says: "Every case, promising or unpromising, should be treated by surgical operation at the earliest possible moment." In the International Journal of Surgery, June, 1900, in answer to the question, "When should we operate?" he says: "If the danger increases with time, if the mortality increases with time, and if the period of convalescence increases with the length of time which elapses between the onset of the attack and the time of operation, there is no ground that I can see for putting off operation, if that is the line of procedure, beyond the first twenty-four hours. * * * Therefore my conclusion is that we are not justified in holding a single case of appendicitis beyond the first twenty-four hours after the diagnosis is made, and it is my belief that in an enormous percentage of cases the diagnosis can be made as absolutely in the first twenty-four hours as it can at any other time."

Dr. McBurney in Annals of Surgery, April, '91, says: "Laparotomy is indicated before the pathological process has reached a very advanced stage. This cannot be measured by time. In some the rapidity of the process is very marked, in others very slow. Some patients ask for attendance on the first day, and some not until the third or fourth day." In New York Medical Record, April 16, '92, he says: "Operations for acute appendicitis performed at the right time and before the disease has progressed too far, are almost invariably successful."

Dr. Wyeth in the New York Medical Journal, June 30, '94, says: "In my entire personal experience not a death has been seen which could not properly be ascribed to delay in timely and skillful surgical interference. Every case from the very beginning should be treated by a surgeon, with a medical attendant."

Dr. R. T. Morris in the Medical Record, December 26, '96, gives a series of one hundred cases in which his death rate was 2 per cent. He estimates that from the character of these cases the death rate if all of the one hundred had been treated medically alone would have been at least 28 per cent.

Dr. Marshall in the Boston Medical and Surgical Journal, July 21, '92, says: "If no improvement shows itself within forty-eight hours an exploratory incision should at least be made."

Dr. Grandin in the New York Medical Record, December 1, '94, says: "It is preferable to perform an aseptic exploratory section and be proved wrong in the diagnosis than to wait until an operation is rendered necessary by perforation and peritonitis."

John Deaver, in his book on "Appendicitis," published in '96, page 123, says: "The proportion of cases that have but one attack, remaining perfectly well after its subsidence, is so small compared to those who have repeated attacks with an interval of invalidism, that I do not believe the rare exception should interfere with the rule, viz.: That where practicable all cases of appendicitis should be operated upon as soon as the diagnosis has been established. Of course I do not include cases in collapse. It is sometimes *advised* to delay operation until there is evidence of pus, and that if there is any doubt as to pus formation the operation should be deferred. To defer operation a certain number of days, or even hours, is to expose the patient to risks not justifiable in the present status of appendiceal surgery."

On page 125 Deaver also says: "In those cases in which, for some reason, the operation was not performed in the first stages of the disease, and where the patient apparently recovers from the attack—the appendiceal inflammation becoming chronic—I believe the appendix should always be removed between the attacks, when the disease is more or less quiescent. There is no doubt in my mind that without exception every appendix that has been the seat of an inflammatory process is a source of danger to the life of the patient, liable at any time to acute inflammation, and should therefore be removed. The mortality from the operation in chronic cases is exceedingly small."

Dr. Gage in the Boston Medical and Surgical Journal, May 24, '94, says: "The earlier the operation the less need of drainage and the firmer the abdominal wall. Surgeons seldom regret an early operation."

Dr. Kennedy in the Medical Record, November 14, '96, says: "The physician or surgeon who hesitates to advise operation robs

his patient of one of the best means known to science in the present day of saving life in this dreaded disease."

Dr. C. P. Noble, Medical News, November 28, '96, says: "The safest general rule is to operate as soon as a diagnosis of appendicitis is made."

Dr. A. M. Cartlege in Medical News, November 28, '96, says: "We should operate on every operable case as soon as a diagnosis is made. Mistakes are made by waiting and watching for symptoms to manifest themselves."

In conclusion, gentlemen, allow me to state that the experience of the men whom I have quoted will reach many thousands of cases, and to me their evidence far outweighs anything that I have ever seen or heard on the opposite side of the question. My own experience, which is limited compared to these men, bears me out in the belief that appendicitis, ere long, will be considered *strictly a surgical disease*, and that nearly all surgeons and practitioners will recommend the earliest possible operative interference.

DISCUSSION.

Dr. Whitney: I have had my say, and I do not think I care to take up any farther time. I am very glad to have had my paper discussed as it has been. I don't think the question should be considered as to whether appendicitis is a medical or a surgical disease. It is medical when it is in the hands of the physician, and becomes surgical when it goes to the surgeon. As I stated in my paper, I think a great many cases should be operated on within the first twenty-four hours, but after having concluded that operation is not imperative I would put the case upon opium and keep it there.

Dr. Perkins—I have little or nothing to add in closing the discussion. I think the greater part of the difference of opinion arises from the fact that the medical men have included in their statistics the cases of catarrhal appendicitis and appendix colic, both of which I excluded from consideration in my paper. These make up seventy-five to eighty per cent. of all the cases seen by the general practitioner. In some of the statistics given, mention

was made of a certain number of cases treated medically, in which ten cases were turned over to the surgeon and the mortality in the remaining cases was ten per cent. The ten turned over to the surgeon properly belong in the mortality list of the physician, as the referring of them to the surgeon is an admission that they were beyond hope of recovery by medical treatment, and yet the surgeon no doubt saved a large percentage of them. There were eighty per cent. cured by medical treatment. This is about the proportion in which the catarrhal and colic cases usually occur.

It is hardly fair to treat a case medically until it is probably too late to save it by any means, and then turn it over to the surgeon. The surgeon should be allowed to take it, if at all, at a time when his work will tell to the best advantage.

Surgeons' statistics have to bear the injustice of many cases turned over to them too late, while medical statistics are relieved of these very cases so turned over, and yet the surgical men show, by far, a lower mortality rate at the present time, and would show a much lower rate if allowed to operate all infective cases within the first forty-eight hours of the beginning of the attack.

List of Members.

Date.		
1900	Alexander, G. E	Castle Rock
1898	Allen, J. Q	Montrose
1894	Ambrook, Mary L	Boulder
1873	Anderson, B. P	Colorado Springs
1886	Arbogast, B. A	Breckenridge
1892	Ashbaugh, A	Central City
1896	Ashley, Wm. W	Ouray
1900	Atcheson, G	Idaho Springs
1894	Bagot, W. S	Denver
1898	Baird, W. J	Denver
1898	Baker, J. A	Florence
1892	Baker, Madeline Marquette	Evergreen
1897	Ballin, M	Leadville
1892	Bane, W. C	Denver
1895	Beatty, J. T	Highlands
1897	Beggs, Wm. N	Denver
1892	Bellrose, Norman W	Eaton
1898	Bennett, A. L	Denver
1897	Bergtold, W. H	Denver
1878	Beshoar, M	Trinidad
1894	Black, J. A	Pueblo
1892	Black, Melville	Denver
1895	Blaine, J. M	Denver
1879	Blickensderfer, J. C	Denver
1888	Boice, Jno	Denver
1888	Bonnet, W. M	Denver
1892	Bonney, S. G	Denver
1894	Boyd, E. T	Leadville

Date.		
1895	Brasher, Lewis B	Denver
1895	Brown, Elizabeth E	Denver
1895	Buchtel, W. H	Denver
1894	Bulette, W. W	Pueblo
1896	Bull, F. B	Kiowa
1894	Bull, H. R	Grand Junction
1900	Burke, Marion	Colorado Springs
1894	Burns, T. M	Denver
1896	Burns, Horace R	Leadville
1899	Burroughs, J. A	Asheville, N. C.
1895	Calhoun, A. W	Denver
1897	Call, Chas. H	Greeley
1892	Campbell, W. A	Colorado Springs
1883	Carlin, P. V	Denver
1895	Carlin, T. J	Denver
1895	Carrier, F. N	Cañon City
1898	Carver, W. B	Denver
1898	Chapman, W. S	Rouse
1897	Chenoweth, M. S	Elbert
1894	Chipman, J. C	Sterling
1883	Clark, J. K	Denver
1889	Clark, J. L	Denver
1898	Clark, L. G	Glenwood Springs
1897	Cline, J. W	Georgetown
1894	Cochems, F. N	Salida
1899	Coffman, F. R	Minturn
1900	Cole, J. H	Leadville
1898	Coleman, J. F	Montrose
1899	Coman, L. Z	Boulder
1898	Condon, J. F	Breckenridge
1894	Conroy, C. P	Denver
1890	Coover, D. H	Denver
1882	Corwin, R. W	Pueblo
1883	Craig, W. B	Denver
1878	Craven, T. H	Cañon City
1894	Davis, W. B	Pueblo
1892	Davis, W. C	Denver
1895	Davis, W. H	Denver

Date.		
1899	Dayton, D. F.	Trinidad
1894	Dean, M. H.	Glenwood Springs
1874	Denison, Chas.	Denver
1899	Denney, R. H.	Elbert
1895	Delehanty, Edw.	Denver
1887	Dorland, W. L.	Pueblo
1898	Dow, W.	La Junta
1894	Durbin, L. T.	Denver
1897	Edson, Carroll E.	Denver
1891	Elliott, Jno. F.	Idaho Springs
1899	Elliott, H. R.	Denver
1871	Elsner, Jno.	Denver
1885	Eskridge, J. T.	Denver
1897	Espey, Jno. R.	Trinidad
1890	Exline, J. W.	Denver
1899	Farnsworth, J. A.	Fort Morgan
1895	Fierstone, J. L.	Fort Morgan
1888	Finney, Frank.	La Junta
1897	Fischer, P. W.	Walden
1882	Fisk, S. A.	Denver
1891	Fleming, C. K.	Denver
1885	Forhan, T. J.	Rouse
1891	Foster, Jno. M.	Denver
1895	Freeman, Leonard.	Denver
1896	Freeman, Russell B.	Denver
1898	Friend, F. M.	Lamar
1898	Gale, J. A.	Denver
1897	Gallaher, T. J.	Denver
1885	Galloway, B. S.	Leadville
1888	Gardiner, C. F.	Colorado Springs
1897	Garnett, A. H.	Colorado Springs
1894	Gilbert, Bartlett.	Durango
1893	Gildea, P. F.	Colorado Springs
1898	Graham, C. A.	Denver
1879	Graham, J. W.	Denver
1885	Graham, R. F.	Greeley
1890	Grant, W. W.	Denver
1898	Grass, J.	Trinidad

Date.		
1898	Greedy, F. A	Denver
1880	Greene, J. L	Minturn
1896	Griffith, Benj. F	Leadville
1897	Guthrie, E. C	Aspen
1884	Hall, J. N	Denver
1900	Hally, C. R	Fort Collins
1898	Hamly, L. B	Salida
1888	Harrison, M	Boulder
1889	Hart, James A	Colorado Springs
1894	Harvey, H. G	Denver
1892	Haskins, B. F	La Junta
1885	Hassenplug, G. K	Denver
1898	Hasty, J. G	Lamar
1879	Hawes, Jesse	Greeley
1880	Hawkins, T. H	Denver
1895	Heath, Lillian	Rawlins, Wyo.
1897	Heimberger, D	Leadville
1893	Hershey, E. P	Denver
1894	Hickey, C. G	Denver
1893	Higgins, J. W	Denver
1895	Hill, E. C	Denver
1899	Hillkowitz, P	Denver
1898	Hoffman, D. S	Lake City
1892	Holmes, A. M	Denver
1898	Holmes, W. E	Gunnison
1894	Hopkins, S. D	Denver
1875	Horn, T. G	Colorado Springs
1898	Hotopp, Theo	New Castle
1894	Howard, E	Denver
1897	Hubbell, S. J	Fort Lupton
1886	Hughes, T. A	Denver
1897	Hutchings, R. K	Colorado Springs
1892	Hutchinson, J. Cooper	Florissant
1898	Ingersoll, L. F	Grand Junction
1895	Jackson, Edw'd	Denver
1898	Jackson, F. A	Salida
1895	Jaeger, Chas	Denver
1898	James, F. E	Estes Park

Date.		
1898	Jay, M.	Gunnison
1884	Jayne, W. A.	Denver
1896	Jeannotte, J. A.	Leadville
1895	Jefferson, B. L.	Hayden
1895	Jeffery, Alicia F.	Denver
1900	Johnson, B. I.	Denver
1897	Johnson, Dryden	Antonito
1898	Johnson, H. R.	St. John's, Ariz.
1895	Johnson, J. E.	Kokomo
1899	Kahn, Maurice	Leadville
1891	Kahn, Sol G.	Leadville
1896	Kearby, E. W.	Rocky Ford
1893	Keith, John G.	Leadville
1884	Kelly, J. P.	Golden
1896	Kemble, L. H.	Denver
1896	Kickland, W. A.	Fort Collins
1890	King, A. T.	Pueblo
1897	Kinney, J. E.	Denver
1892	Kleiner, M.	Denver
1895	Lake, E. F.	Denver
1891	Law, G.	Greeley
1896	Law, John	Leadville
1889	Leavitt, B. C.	Denver
1882	Lee, E. A.	Fort Collins
1873	Lemen, L. E.	Denver
1892	Le Mond, R. F.	Denver
1887	Levy, Robert	Denver
1891	Liebhardt, Laura L.	Denver
1895	Liggett, Wilbur T.	Cripple Creek
1896	Little, W. T.	Cañon City
1898	Littrell, R. S.	Rye
1891	Lobingier, A. Stewart	Denver
1898	Lockard, W. G.	New Castle
1896	Love, Minnie C. T.	Denver
1896	Lucy, Daniel R.	Denver
1888	Lyman, C. B.	Denver
1894	Mack, M. H.	Denver
1898	Mackintosh, N.	Gunnison

Date.		
1898	Macalester, R. K.	Glenwood Springs
1896	Maclean, A. M.	Leadville
1896	Macomber, G. N.	Denver
1898	Mafan, T.	Salida
1896	Mann, Alfred	Denver
1893	Melvin, J. Tracy	Saguache
1892	Miel, Geo. W.	Denver
1900	Mitchell, Elsie R.	Denver
1897	Mitchell, Wm. C.	Denver
1897	Moore, Alice T.	Denver
1894	Moulton, G. H.	Demerara, British Guiana
1896	Mugrage, S. G.	Denver
1894	Muir, Hannah T.	Colorado Springs
1891	Munn, W. P.	Denver
1896	McCreery, R. L.	Magallon, N. M.
1900	McClanahan, Z. H.	Colorado Springs
1894	McDermith, S. T.	Denver
1894	McDonald, A. J.	Leadville
1894	McDonald, W. J.	Rocky Ford
1897	McDowell, U. D.	Longmont
1899	McFadden, J. G.	Loveland
1892	McHugh, P. J.	Fort Collins
1898	McKelvy, W.	Breckenridge
1895	McKenzie, George	Victor
1884	McLauthlin, H. W.	Denver
1900	McMullin, Smith	Castle Rock
1891	McNaught, F. H.	Denver
1895	Neuman, Daniel	Denver
1896	Nichols, Chas. B.	Fort Wingate, N. M.
1894	Nickerson, W. M.	Denver
1882	O'Connor, J. W.	Denver
1899	Oettinger, B.	Denver
1899	Orr, C. S.	Alamosa
1898	Otis, W. D.	Fort Morgan
1890	Packard, Geo. B.	Denver
1898	Packard, W. A.	Monte Vista
1885	Parkhill, Clayton	Denver
1895	Peavey, Josephine L.	Colorado Springs

Date.		
1895	Pennock, V. R.	Cripple Creek
1887	Perkins, I. B.	Denver
1894	Perkins, J. M.	Denver
1890	Pershing, H. T.	Denver
1885	Pfeiffer, O. J.	Denver
1882	Phillips, G. W.	La Junta
1898	Porter, F. R.	New Windsor
1898	Prewitt, F. E.	Durango
1895	Powers, Chas. A.	Denver
1893	Powers, J. J.	Denver
1895	Purcell, J. W.	Denver
1897	Reed, W. W.	Fowler
1900	Riley, W. H.	Boulder
1882	Rivers, E. C.	Denver
1896	Roberts, Una G.	Denver
1887	Robinson, A. J.	Aspen
1898	Robinson, A. L.	Glenwood Springs
1889	Robinson, J. R.	Colorado Springs
1898	Robison, M. A.	Victor
1898	Roehrig, G. F.	Denver
1883	Rogers, E. J. A.	Denver
1898	Rogers, F. E.	Littleton
1884	Rothwell, E. J.	Denver
1884	Rothwell, P. D.	Denver
1889	Rothwell, Wm. J.	Denver
1897	Rothwell, Wm. J.	Hugo
1897	Rowan, W. W.	Ouray
1899	Rucker, P. T.	Basalt
1895	Sawins, A. H.	Denver
1893	Seebass, Alfred R.	Denver
1891	Sewall, Henry	Denver
1887	Shollenberger, C. F.	Denver
1895	Shotwell, W. E.	Denver
1895	Sigman, H. G.	Rocky Ford
1896	Simon, Saling	Denver
1897	Singer, W. F.	Pueblo
1893	Sirois, E.	Denver
1898	Smith, F. M.	Holyoke

Date.		
1898	Smith, J. Sol	Denver
1898	Smith, W. W	Erie
1892	Snitcher, H. C	Denver
1875	Solly, S. E	Colorado Springs
1896	Spivak, C. D	Denver
1895	Spratlin, P. E	Denver
1871	Stedman, A	Denver
1898	Stephenson, W. C	Florence
1899	Stevens, E. W	Denver
1895	Stiver, Thomas J	Denver
1894	Stover, George H	Denver
1879	Strickler, W. M	Colorado Springs
1892	Stuver, E	Fort Collins
1898	Sumner, C. O	Fairplay
1896	Taussig, Arnold S	Denver
1891	Taylor, Hugh L	Denver
1889	Taylor, T. E	Denver
1897	Thomas, J. N	Denver
1878	Thombs, P. R	Pueblo
1894	Thompson, David	Denver
1896	Thorp, R. L	Denver
1896	Thorp, Chas. W	Denver
1898	Thrailkill, G. H	Gerard, Kan.
1898	Trovillion, E. B	Gold Hill
1892	Tucker, Beverly	Colorado Springs
1897	Tyler, G. E	Denver
1892	Van Meter, S. D	Denver
1899	Van Zant, C. B	Denver
1891	Vroom, J. N	Denver
1899	Warren, H. E	Denver
1893	Waxham, F. E	Denver
1896	Wetherill, H. G	Denver
1894	Wheeler, E. A	Denver
1895	Whiting, J. A	Cripple Creek
1888	Whitney, H. B	Denver
1896	Wiest, Sard	Longmont
1900	Wilcox, H. W	Silver Plume
1900	Wilder, J. A	Denver

Date.		
1899	Williams, A. H	Denver
1898	Williams, C. W	Manzanola
1895	Williams, T. J	Leadville
1874	Wilson, W. E	Denver
1889	Work, Hubert	Pueblo
1887	Worthington, A. K	Denver
1897	Zederbaum, Adolph	Denver

HONORARY MEMBERS.

Date.		
1880	*O. D. Cass, M. D.	
1873	*Hon. John Evans, M. D.	Denver
1889	Thos. F. Rambold, M. D.	St. Louis, Mo.
1879	D. H. Dougan, M. D.	Denver
1895	Prof. John Ridlon, M. D.	Chicago, Ill.
1895	Prof. Frank Norbury, M. D.	St. Louis, Mo.
1895	Prof. Victor C. Vaughan, M. D.	Ann Arbor, Mich.
1899	Robert H. Babcock, M. D.	Chicago, Ill.
1899	John B. Roberts, M. D.	Philadelphia, Pa.
1900	H. A. Lemen, M. D.	Denver
1900	W. R. Whitehead, M. D.	Denver
1900	W. F. McClelland, M. D.	Denver
1900	F. J. Bancroft, M. D.	Denver
1900	C. K. Mills, M. D.	Philadelphia, Pa.
1900	C. B. Nancrede, M. D.	Ann Arbor, Mich.
1900	Lieutenant-Colonel H. Lippincott, M. D.	U. S. A.

*Deceased.

Total active membership.....301

DECEASED MEMBERS.

NAME.	Year Elected	Age	Residence at Death.	Date of Death.	MEDICAL COLLEGE.	Year Grad.
Lionberger, D. B.	1872	....	Denver	1873	.....	.....
Davis, S. B.	1873	....	Central City	1875	{ Rush Medical College { University Medical College, N. Y.	1865 1866
Johnson, G. L.	1874	....	Denver	1875	Medical Department Iowa University	1872
LeCarpentier, Jules	1875	....	Fairplay	1876	University Paris	1865
Davis, M. J.	1872	....	Golden	1876	.....	.....
Thacker, W. H.	1871	....	Denver	1876	Medical Department University Michigan	1862
Boone, S. H.	1873	....	Denver	1877	University of Louisville, Ky.	1857
Lansingh, K. V. R.	1876	....	Denver	1879	Albany Medical College	1870
Dickinson, J. S.	1871	....	Denver	1879	Royal College Surgeons, England	.....
Taylor, R. T.	1873	....	Leadville	1882	.....	.....
Gambell, F. W.	1881	....	Leadville	1882	Detroit Medical College	1873
Warn, W. H.	1879	....	Denver	1882	College Physicians and Surgeons, N. Y.	.....
Wilson, M. A.	1880	....	Denver	1882	Ohio Medical College	1866
Craven, J. S.	1880	....	Pueblo	1884	Iowa State University, Medical Department	1867
Griffith, D. S.	1882	....	Durango	1886	Jefferson Medical College	1863
Mavity, W. K.	1884	....	Denver	1886	Jefferson Medical College	1865
McMurtrie, G. S.	1873	61	Denver	August, 1887	University Pennsylvania, Medical Dept.	1860
Buckingham, R. G.	1871	73	Denver	March 18, 1889	Berkshire Medical College	1836
Lathrop, Charles C.	1877	36	Denver	May 28, 1889	Bellevue Hospital Medical College	1875
Fay, William M.	1883	33	Denver	January 13, 1889	Kansas City Medical College	1881
Brumond, P. B.	1884	....	Idaho Springs	September 13, 1889	Chicago Medical College	1868

Grimes, W. S.	1883	....	Denver	December 21, 1889	Miami Medical College	1857
James, H. C.	1881	50	Ouray	January 4, 1890	Jefferson Medical College	1870
Wooster, David	1888	37	Idaho Springs	April 8, 1891	Medical Department University of Cala.	1885
Keables, E. H.	1888	71	Alma	January 6, 1892	Bellevue Hospital Medical College	1861
Cory, J. B.	1883	54	Denver	January 24, 1892	Medical Department University of Michigan	1862
Worthington, R. H.	1884	46	Denver	May 13, 1892	Medical Department University of Denver	1884
Parker, C. M.	1873	54	Denver	August 12, 1892	{ University of Louisiana { Medical College of Virginia	1859 1862
Wicks, E. G.	1889	34	Denver	August 26, 1892	Medical Department University of Maryland	1888
Davis, J. C.	1880	66	Zurich, Switzerland	October 8, 1892	Castleton Medical College	1847
Steele, H. K.	1871	68	Denver	January 20, 1892	University City of New York	1848
Williams, W. H.	1871	53	Denver	March 15, 1893	University of Louisiana	1867
Keating, J. M.	1892	42	Colorado Springs	November 18, 1893	University of Pennsylvania	1873
Finfrock, J. H.	1885	....	Boise City, Idaho	February, 1894	Medical College of Ohio	1863
Tucker, B. St. George	1880	55	Colorado Springs	March 30, 1894	University City of New York	1860
Reed, Charles M.	1894	24	Dotsero, Colo.	September 29, 1894	University of Louisville	1892
Scully, D. J.	1893	33	Lindsay, Ontario	April 21, 1895	McGill University	1887
Powers, J. W.	1892	37	Salt Lake City	March 25, 1895	Rush Medical College	1885
Jenner, C. W.	1891	55	Denver	August 11, 1895	Western Reserve Medical College	1882
Adams, B. F. D.	1888	....	Colorado Springs	October 28, 1895	Harvard Medical School	1862
D'Avignon, F. F.	1880	49	Leadville	November 6, 1895	McGill University	1871
Rose, Edward P.	1892	40	Salt Lake City	November 6, 1895	South Carolina Medical College	1878
Manly, Chas. S.	1892	29	Denver	November 13, 1895	Medical Department Denver University	1891
Bosanko, S. Arthur	1885	39	Leadville	November 23, 1895	.....	.....
Fearing, Sarah J.	1895	38	Denver	January 11, 1896	Woman's Medical College, Philadelphia	1890
Cattanach, A. J.	1889	49	Denver	May 30, 1893	McGill University, Montreal	1871

DECEASED MEMBERS.—*Concluded.*

NAME.	Year Elected	Age	Residence at Death.	Date of Death.	MEDICAL COLLEGE.	Year Grad.
Reed, Jacob, Jr.	1877	57	Colorado Springs	December 15, 1896	Jefferson College, Pennsylvania	1866
Morgan, Anna E.	1892	....	Denver	January 23, 1896	Medical Department Denver University	1892
Mager, Hugo	1895	46	Denver	July 18, 1897	Northwestern Medical College	1883
Willard, J. J.	1894	36	Pueblo	March 29, 1898	University of Vermont	1888
Crouch, H. C.	1892	40	Denver	April 20, 1898	University of Gœttingen	1890
Herrick, J. C.	1891	55	Denver	September 30, 1898	Yale and Long Island College Hospital	1865
Dawson, J. W.	1878	51	Canon City	January 8, 1899	Rush Medical College	1871
Kahn, Lee	1892	31	Leadville	February 26, 1899	Starling Medical College, Columbus, Ohio	1888
Axtell, Edwin R.	1892	33	Denver	December 15, 1899	Miami Medical College, Cumberland	1888
Burleigh, Geo. W.	1896	30	Boulder	October 28, 1899	University of Michigan	1894
Wood, L. H.	1885	52	Denver	September 5, 1899	Yale Medical School	1869
Hamilton, Geo.	1896	....	La Jara	March, 1900	St. Louis Medical College	1879
Hazlett, H. F.	1896	33	Pueblo	March 4, 1900	Jefferson Medical College	1892
Liggitt, R. D.	1898	....	Mosca	1899-1900	Toledo Medical College	1884
Maffett, L. O.	1897	41	Colorado Springs	April 6, 1900	Medical College of Ohio	1885
McAlister, S.	1898	....	Rocky Ford	1899-1900	University of Vermont	1895

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